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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

January 26–February 22, 1941

The accompanying table (table 2) summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended February 22, 1941, the number reported for the corresponding period in 1940, and the median number for the years 1936–40.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—The number of reported cases of influenza dropped from 383,630 for the 4 weeks ended January 25 to 146,496 for the 4 weeks ended February 22. However, while the disease has declined in all sections of the country, the total number of cases was more than twice the number reported for the corresponding period in 1940 and more than 5 times the 1936–40 median incidence for this period.

In the Pacific region where the current epidemic started, the incidence dropped below the average seasonal expectancy for this period, but all other regions continued to report a relatively high incidence. Practically every section of the country has been affected by the current epidemic, starting in the Western States with a peak of approximately 37,000 cases reported from the Mountain and Pacific regions during the week ended December 21, 1940; then spreading into the southeastern regions with a peak of approximately 58,000 cases during the week ended January 11; and into the South Atlantic region where the highest weekly incidence was reported during the week ended January 25 (approximately 50,000 cases). In the East North Central, West North Central, and New England regions the disease did not appear until about the middle of January, and in the Middle Atlantic region the highest weekly incidence was reported during the week ended February 1.

Mortality from all causes for the total number of cities reporting still shows, for February, a slight excess over an average rate for the

years 1938-40—13.6 as compared with 13.3 per 1,000. The excess is somewhat less than that reported for the month of January. Table 1 shows weekly rates of mortality from all causes during the first 8 weeks of 1941 for all cities reporting and for nine geographic subdivisions compared with an average rate of the 3 preceding years. Death rates for the first 3 weeks of February for 88 cities combined show a slight excess above the average, while mortality for the fourth week of February was definitely below the average. In all western sections, that is, the Pacific, Mountain, West North Central, and West South Central, and in the East South Central region, mortality from all causes has been below the average since and including the second week in February. In the eastern sections, that is, the East North Central, Middle Atlantic, South Atlantic, and New England, the excess continued through the third week of February. In New England where the excess in mortality from all causes has been most marked, the peak was reached during the fourth week of January; the rate declined during February to a rate below the average for the fourth week of February. In each section of the country, therefore, mortality from all causes had fallen below the average of the preceding 3 years before the end of February.

TABLE 1.—Mortality from all causes in cities in 9 geographic sections of the United States for the first 8 weeks of 1941 compared with an average of the 3 preceding years ¹

Section	Death rate per 1,000 (annual basis)							
	Week ended—							
	Jan. 4	Jan. 11	Jan. 18	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22
All cities reporting:								
1941.....	12.9	13.7	13.5	14.6	14.1	14.3	13.6	12.6
Average, 1938-40.....	13.1	13.1	12.9	13.2	13.5	13.4	13.3	13.3
Pacific:								
1941.....	13.8	16.6	13.7	15.4	13.8	13.9	12.9	13.1
Average, 1938-40.....	13.4	14.0	14.0	13.6	13.6	14.3	13.9	13.4
Mountain:								
1941.....	21.5	16.7	17.4	15.3	15.6	12.2	10.5	11.3
Average, 1938-40.....	15.3	13.3	13.5	14.6	14.1	14.3	11.3	14.2
West North Central:								
1941.....	15.0	13.1	13.9	14.1	14.1	13.8	14.0	12.2
Average, 1938-40.....	13.4	13.2	12.8	13.6	13.7	13.3	13.5	13.4
West South Central:								
1941.....	17.9	15.8	16.2	15.6	14.0	13.8	14.5	13.6
Average, 1938-40.....	15.4	14.0	14.5	15.0	16.5	15.4	15.6	15.1
East South Central:								
1941.....	14.0	16.2	18.3	17.3	17.8	14.3	14.9	13.7
Average, 1938-40.....	16.1	15.5	14.5	18.6	16.6	16.0	15.4	13.8
East North Central:								
1941.....	11.1	11.9	11.3	12.6	12.4	13.1	12.5	11.8
Average, 1938-40.....	11.6	12.1	11.4	11.2	11.9	11.8	12.2	12.5
Middle Atlantic:								
1941.....	11.7	12.6	12.6	13.8	13.4	14.8	13.5	12.4
Average, 1938-40.....	12.7	12.4	12.5	12.8	12.9	13.1	12.7	12.5
South Atlantic:								
1941.....	13.0	14.9	14.4	16.0	17.3	14.8	15.1	13.3
Average, 1938-40.....	14.6	14.5	14.4	14.0	16.5	15.4	14.8	15.1
New England:								
1941.....	14.8	16.4	19.8	20.8	18.0	16.1	15.4	13.8
Average, 1938-40.....	13.6	15.1	13.5	14.8	14.6	14.3	13.9	14.5

¹ Based on data received from the Bureau of the Census.

Measles.—The number of cases of measles increased from approximately 40,000 during the week ended January 25 to approximately 73,000 during the week ended February 22. An increase in this disease is expected at this season of the year but the present increase is considerably above the normal expectancy. The current incidence compares with 21,999, 53,546, and 134,607 cases for the corresponding period in 1940, 1939, and 1938, respectively. In 1935, another year in which measles was unusually prevalent, the cases for this period totaled approximately 92,000. The highest incidence was reported from the Middle Atlantic, East North Central, South Atlantic, and East South Central regions, the increases ranging from about twice the 1936–40 median figure for the period in the South Atlantic region to more than 9 times the median incidence in the East North Central region. In the New England, West North Central, Mountain, and Pacific regions the incidence is relatively low.

Poliomyelitis.—The number of cases (101) of poliomyelitis was slightly less than the number reported for the corresponding period in 1940, but it was about 25 percent above the seasonal expectancy. The disease was most prevalent in the East North Central and South Atlantic regions, the incidence in those regions being the highest recorded for this period in recent years.

Whooping cough.—The incidence of whooping cough (16,349 cases) was about 40 percent above that recorded for the corresponding period in 1940 and slightly above the 1936–40 median incidence for this period. The greatest excesses over the normal seasonal incidence were reported from the North Central, South Atlantic, West South Central, and Pacific regions.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended February 22 there were 1,171 cases of diphtheria reported, as compared with 1,565, 1,994, and 2,435 for the corresponding period in 1940, 1939, and 1938, respectively. For the country as a whole the incidence is the lowest on record for this period. In the Mountain region the number of cases was slightly above the seasonal expectancy, but in all other regions the incidence was relatively low.

Meningococcus meningitis.—The number of cases (188) of meningococcus meningitis was slightly above the number reported for the corresponding period in 1940, but it was only about 50 percent of the 1936–40 median figure for this period. Increases over last year were reported from the New England, South Atlantic, and South Central areas, but in all regions except the New England the incidence was below the average seasonal incidence.

Scarlet fever.—The incidence of scarlet fever was also relatively low, the total reported cases being only about 70 percent of the number

reported for the corresponding period in 1940, and less than 60 percent of the 1936-40 median figure for the period. All regions of the country shared in this favorable situation except the East South Central and South Atlantic regions; in the East South Central region the number of cases represented an excess of about 40 percent over the average for preceding years, while in the South Atlantic region the incidence stood at approximately the normal seasonal level.

TABLE 2.—Number of reported cases of 9 communicable diseases in the United States during the 4-week period January 26-February 22, 1941, the number for the corresponding period in 1940, and the median number of cases reported for the corresponding period 1936-40

	Current period	1940	5-year median	Current period	1940	5-year median	Current period	1940	5-year median
	Diphtheria			Influenza ¹			Measles ²		
United States.....	1,171	1,565	2,069	146,496	71,176	28,549	72,972	21,999	28,868
New England.....	7	23	39	1,712	57	76	2,433	3,191	5,160
Middle Atlantic.....	191	265	387	5,162	285	287	29,698	1,688	5,818
East North Central.....	195	304	411	7,383	8,912	5,016	24,059	2,067	2,067
West North Central.....	106	104	168	6,568	833	836	1,932	3,724	3,724
South Atlantic.....	190	266	397	74,515	22,527	9,184	7,041	1,519	3,600
East South Central.....	107	125	173	18,018	5,571	3,630	2,975	812	812
West South Central.....	194	286	299	23,945	26,225	5,299	1,708	1,334	1,646
Mountain.....	98	77	77	4,473	1,528	1,170	1,319	1,860	1,860
Pacific.....	83	115	138	4,740	5,238	5,238	1,807	5,804	5,804
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States.....	188	178	378	101	109	80	13,812	19,277	24,290
New England.....	13	2	12	2	3	2	771	1,050	1,585
Middle Atlantic.....	29	51	60	8	12	7	3,824	6,038	6,038
East North Central.....	13	10	38	22	20	9	4,571	6,368	8,659
West North Central.....	12	19	28	12	10	7	1,282	1,796	3,765
South Atlantic.....	45	36	79	24	14	17	1,051	1,127	1,034
East South Central.....	43	22	92	7	12	14	853	735	615
West South Central.....	22	16	38	11	13	9	350	439	654
Mountain.....	3	12	12	5	6	4	430	734	857
Pacific.....	8	10	16	10	19	16	680	990	1,315
	Smallpox			Typhoid and paratyphoid fever			Whooping cough ³		
United States.....	188	257	1,220	247	292	390	16,349	11,677	³ 15,898
New England.....	0	0	0	12	24	14	1,256	1,152	1,152
Middle Atlantic.....	0	0	0	29	46	53	2,982	3,325	3,768
East North Central.....	72	47	196	29	44	46	3,151	2,070	2,179
West North Central.....	77	102	413	15	20	20	1,120	477	569
South Atlantic.....	0	3	5	45	46	74	2,940	1,423	2,347
East South Central.....	5	13	13	30	20	42	673	436	436
West South Central.....	16	14	36	46	50	77	1,536	572	572
Mountain.....	17	67	126	20	14	16	864	1,290	702
Pacific.....	1	11	95	21	28	28	1,827	932	932

¹ Mississippi, New York, and Pennsylvania excluded; New York City included.

² Mississippi excluded.

³ 3-year (1938-40) median.

Smallpox.—Smallpox again reached a new low level. For the 4 weeks ended February 22 there were 188 cases reported, as compared with 257, 1,554, and 2,241 cases for the corresponding period in 1940, 1939, and 1938, respectively.

Typhoid fever.—There were 247 cases of typhoid fever reported for the current 4-week period, the lowest number recorded for this period in the 13 years for which these data are available. The situation was favorable in practically all sections of the country.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended February 22, based on data received from the Bureau of the Census, was 13.6 per 1,000 inhabitants (annual basis). The rate for the corresponding period in 1940 was 13.2, and the average rate for the years 1938–40 was 13.3. A further discussion of these rates is found under the subject of influenza.

ALCOHOLISM AND PUBLIC HEALTH¹

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Alcoholism is a problem that gives concern to practically all countries with the so-called western civilization. Probably no country has reason to pay more attention to it than the United States and apparently none has achieved less satisfaction from measures designed to combat it. It is a matter of public concern whose health features have been obscured by social and legal factors inseparable from a problem whose central theme is closely bound, on the one hand, to the profit motive and, on the other hand, to poverty, delinquency, and crime.

Alcohol has therapeutic and food values and is harmless when appropriately used in medical practice for these values. It becomes a health problem through its use as a beverage and because of its intoxicating properties and its power to enslave certain types of persons. Such persons, becoming so enslaved, indulge to excess and suffer physical, social, and mental deterioration thereby. These facts are brought about partly by the direct effect of alcohol and partly by factors associated with its excessive use.

There are no accurate statistics covering all phases of the alcohol problem; consequently its extent is not accurately known. The best statistics available are those dealing with admissions to hospitals for mental disease of patients suffering with alcoholic psychosis, and with deaths due to alcoholism; but it is not known what proportion of chronic alcoholics become psychotic or what proportion of excessive drinkers so obviously die from the effects of alcohol that their deaths

¹ Read at the meeting of the American Association for the Advancement of Science, held in Philadelphia from December 27, 1940, to January 2, 1941, as a part of the Symposium on Alcoholism sponsored by the Research Council on Problems of Alcohol, and published in the *Quarterly Journal of Studies on Alcohol*, vol. 1, No. 4 (March 1941). Reprinted here by permission of the *Quarterly Journal of Studies on Alcohol*.

are attributed to alcoholism. Admissions for acute alcoholism to hospitals in certain cities and arrests throughout the country for drunkenness and disorderly conduct, a condition often associated with drunkenness, give additional information as to the extent of that type of drinking which leads to exposure, neglect, and disease. The association of alcohol with crimes more serious than drunkenness also throws some light on the picture, but our knowledge of this subject is very incomplete.

ADMISSION RATES IN HOSPITALS FOR MENTAL DISEASE

Alcoholic psychoses accounted for 4.5 percent of all first admissions to hospitals for mental disease in the United States in 1938. An additional 6.9 percent were patients suffering with alcoholism without psychosis. There was a higher percentage of first admissions only for the psychoses associated with the aged (cerebral arteriosclerosis and senility) and the so-called functional psychoses (manic depressive psychosis and dementia praecox). The admissions due to syphilis exceeded those due to alcoholic psychoses, but were exceeded by admissions due to the combined causes of alcoholic psychoses and alcoholism without psychosis. Patients admitted to hospitals for mental disease with the diagnosis of alcoholism without psychosis are as a rule suffering with an extreme grade of chronic alcoholism. The admission rate for alcoholism with psychosis was 3.7 per 100,000 for the total population in 1938. The rate for 1922, the first year for which rates for all mental hospitals are available, was 2.5 per 100,000. In 1933, the first year of prohibition repeal, the rate was 3.7. It rose to 4.4 in 1937 and has since declined slightly. The trend of the rates of admission of patients for alcoholism without psychosis corresponds with the rates for those with psychosis (table 1).

TABLE 1.—*First admission rates for alcoholism with and without psychosis to all institutions for mental disease in the United States, 1922,¹ 1933-1939*

Year	Alcoholism (with psychosis)		Alcoholism (without psychosis)	
	Number of patients	Rate per 100,000 of the total population	Number of patients	Rate per 100,000 of the total population
1922.....	2,693	2.5	(²)	
1933.....	4,651	3.7	4,202	3.4
1934.....	4,762	3.8	6,271	5.0
1935.....	4,883	3.8	6,487	5.1
1936.....	5,274	4.1	7,813	6.1
1937.....	5,639	4.4	8,453	6.6
1938.....	4,913	3.7	7,575	5.8
1939.....	4,773	3.6	7,458	5.7

¹ Data are available for State hospitals only during the years 1922-1932.

² Data are not available for categorical breakdown of first admissions without psychosis.

First admission rates of various geographic regions for the year 1938 are shown in table 2. The differences shown for the different areas for that year are approximately the same as for other years. The New England States, with a rate of 6.6, had the highest admission rate of any region for patients with alcoholic mental disease, and the Mountain and East South Central States, with a rate of 1.4, had the lowest. The regional rates for patients with psychosis are influenced, to a certain extent, by the availability of hospital beds. The Pacific States, with a rate of 13.1, had the highest rate of admissions for alcoholism without psychosis, and the West South Central States, with a rate of 2.6, had the lowest rate. The rates of admission for alcoholism without psychosis are influenced greatly by local practices in the handling of chronic alcoholics, and they cannot be interpreted as an accurate measure of the relative prevalence of alcoholism in the various regions.

TABLE 2.—*First admission rates for alcoholism with and without psychosis to all institutions for mental disease by region, 1938*

Region	Alcoholism (with psychosis)		Alcoholism (without psychosis)	
	Number of patients	Rate per 100,000 of the total population	Number of patients	Rate per 100,000 of the total population
United States.....	4, 913	3. 7	7, 575	5. 8
New England.....	561	6. 6	424	5. 0
Middle Atlantic.....	1, 405	5. 1	981	3. 6
East North Central.....	1, 115	4. 2	1, 443	5. 4
West North Central.....	325	2. 4	745	5. 5
South Atlantic.....	494	2. 8	1, 678	9. 4
East South Central.....	155	1. 4	566	5. 3
West South Central.....	238	1. 8	339	2. 6
Mountain.....	58	1. 4	127	3. 1
Pacific.....	562	5. 8	1, 272	13. 1

Source: "Patients in Hospitals for Mental Disease," Bureau of the Census, U. S. Department of Commerce, 1938.

DEATH RATES FOR ALCOHOLISM

Death rates for alcoholism have been available for the expanding registration area of the United States since 1910. In that year the rate was 5.4 per 100,000. The highest recorded rate, 5.9, was in 1913. It declined from 5.2 in 1917 to 1.0 in 1920, then gradually rose to 4.5 in 1927 and 1928, since which time the trend has again been downward. The rate has been influenced to some extent from time to time by the addition of new States to the death registration area, in most of which the rates were lower than in the registration area as a whole. In 1927, with 42 States and the District of Columbia in the death registration area, the rate was 3.7. The rates have varied in different parts of the country. The Middle Atlantic States and most of the New England States have consistently had high rates. There was a decided drop in rates in all regional areas during the period of effective prohibition, 1919-21. From 1910 to 1918 Montana had a higher rate

than any other State. Nevada came into the registration area in 1929 and has had the highest rate every year since then except in 1933. The South Atlantic, South Central, and Plains States have had lower rates than the rest of the country. The rates in Kansas have been consistently low. Kansas came into the registration area in 1914 and has had a lower rate than any other State in seven of the succeeding years and shared the low rate one other year. South Carolina had the lowest rate for seven years. Other States that have had the lowest rate for a year or more are North Carolina, Mississippi, Alabama, Louisiana, North Dakota, South Dakota, and Utah. States having the lowest

**DEATH RATES
PER 100,000 OF THE ESTIMATED POPULATION
FOR ALCOHOLISM
1910-1938**

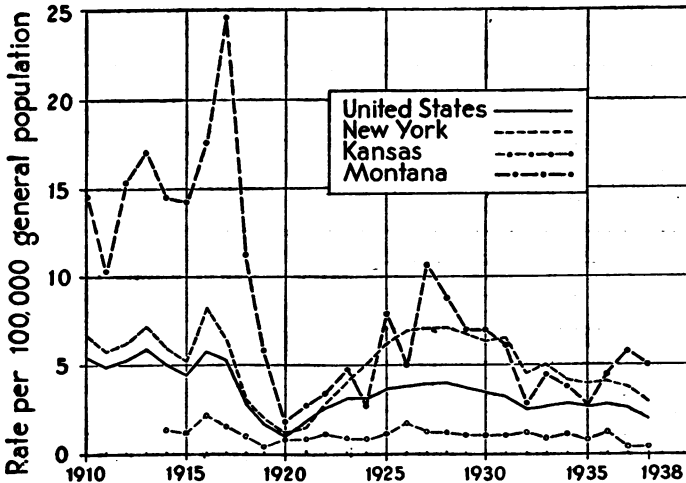


FIGURE 1.

rates before Kansas came into the registration area are Maine (once) and Kentucky (three times). The States that later on were shown to have low rates were not reporting at that time. As a rule, low rates correspond to restrictions on the sale of liquor and the preponderance of rural population, but for some unexplained reason the highly rural States of Montana and Nevada have had the highest rates.

Various factors associated with the first World War and growing restrictions on the manufacture and sale of liquor caused a drop in the rates for deaths from alcoholism in 1918 in every State except Washington. The rates continued to fall in practically all States until 1920 and then began to rise. The rate in Montana dropped from 24.6 in 1917 to 1.8 in 1920, but rose to 10.7 by 1927. Montana had State-wide prohibition from 1919 to 1926, but the rate nevertheless rose to 7.6 in 1925. Figure 1 shows the alcoholic death rates for the United States, New York, Montana, and Kansas, for the period 1910 to 1938.

Kansas had State-wide prohibition during the entire period. The rates for the Nation as a whole have not materially changed since the repeal of prohibition in 1933. The rate for 1938, 2.0, is the lowest since 1921.

It is well known that the number of recorded deaths due to alcoholism is much lower than the actual number due to this cause. Out of consideration for the families and friends of deceased alcoholic patients, physicians are inclined to record deaths as due to some other cause whenever possible. In spite of this tendency, the figures as given for 1937 show that alcohol caused more deaths than any one of 31 infectious diseases, some of which were formerly veritable scourges. No accurate statistics are available for deaths due to diseases in which alcohol was a contributing factor or for suicides, homicides, and accidental deaths due to alcohol.

In spite of wide areas of prohibition in the United States, the recorded alcoholic death rates were higher here from 1910 to 1930 than in the British Isles, the Scandinavian countries, Holland, or Belgium. Possible explanations are that there is more leisure to drink and more money to buy liquor in the United States than in those countries and higher taxes on spirituous liquor abroad. It is also possible that in filling out death certificates European physicians are even more inclined than ours to spare the feelings of relatives.

In some places in the United States ethyl alcohol may be bought over the counter of drug stores without a physician's prescription. Under this liberal policy the drunkard, with only a few cents in his pocket, can buy enough alcohol to stupefy himself. That he takes advantage of the opportunity afforded him is shown by the fact that in Boston the death rate from alcoholism in 1939 was 16.4 per 100,000, as compared with 4.5 in New York, where a physician's prescription is needed (table 6).

ARRESTS FOR DRUNKENNESS

Arrests for drunkenness are a source of information as to the extent of alcoholism, but local policies as to arrests vary so greatly throughout the country that regional figures are not comparable and definite conclusions cannot be drawn from the available statistics. It is not known what proportion of the persons arrested in any given region are chronic alcoholics or are likely to become so because of innate susceptibility and associated social factors. Nor is it known what proportion of alcoholics who get conspicuously drunk escape arrest in a given year. In 1939, in a group of 1,214 cities with an aggregate population of 39,147,097, there was a total of 634,006 persons arrested and held for prosecution, because of intoxication or of driving while intoxicated (table 3). An additional 159,417 were held for prosecution for disorderly conduct, much of which was doubtless due to drinking. This

does not express the entire figure, because in 872 of these same cities with a population of 23,955,440 there were 74,075 persons arrested for drunkenness and for driving while drunk and 7,784 arrested for disorderly conduct, none of whom were held for prosecution (table 4). Doubtless some of these people were innocent of the charge, but the figures as given are significant.

TABLE 3.—Persons charged (held for prosecution) with drunkenness, driving while drunk, and disorderly conduct, 1939 (1,214 cities, total population 39,147,097)

Offense charged	Number charged and rate
Drunkenness:	
Number of persons charged.....	592,510
Rate per 100,000 of population.....	1,513.5
Driving while intoxicated:	
Number of persons charged.....	41,496
Rate per 100,000 of population.....	106.0
Disorderly conduct:	
Number of persons charged.....	159,417
Rate per 100,000 of population.....	407.2

Source: Uniform Crime Reports, Volume XI, No. 1, Federal Bureau of Investigation, U. S. Department of Justice.

TABLE 4.—Persons released without being held for prosecution for drunkenness, driving while drunk, and disorderly conduct, 1939 (872 cities, total population 23,955,440)

Offense	Number and rate
Drunkenness:	
Number of persons released.....	73,435
Rate per 100,000 of population.....	306.5
Driving while intoxicated:	
Number of persons released.....	640
Rate per 100,000 of population.....	2.7
Disorderly conduct:	
Number of persons released.....	7,784
Rate per 100,000 of population.....	32.5

Source: Uniform Crime Reports, Volume XI, No. 1, Federal Bureau of Investigation, U. S. Department of Justice.

The arrest rates for drunkenness and associated offenses (table 5) vary widely in different regions of the country. The differences probably represent local practices as to arrests rather than the relative amount of drunkenness. This is seen by comparing the arrest rates with the death rates of individual States comprising those regions. The South Atlantic States have an arrest rate three times as high as the Middle Atlantic States, but their death rates² are in the aggregate lower. Other inconsistencies occur. From the incomplete figures that are given, the inference is drawn that there is a more liberal policy as to arrests in the Middle Atlantic and East North Central States than in other parts of the country.

Differences in local practices as to arrests are shown more strikingly by comparing the arrests for alcoholism and alcoholic death rates in

² Bureau of the Census, Vital Statistics—Special Reports, vol. 9, No. 64, pp. 857-864.

New York City, Boston, Baltimore, Philadelphia, and Washington, D. C. (table 6). The alcoholic death rates for Baltimore and Philadelphia were lower than those for New York for each of the years 1935-39, and the rates for Washington, D. C., were lower for each year except 1937, when it was the same; but arrests for drunkenness were from 27 to 47 times higher in Washington, from 14 to 31 times higher in Philadelphia, and from 3 to 6 times higher in Baltimore than in New York. Boston has had the highest rates for both deaths and arrests. Its alcoholic death rates for the 6-year period were from 3 to 4 times higher than those for New York, but its arrest rates have been from 46 to 89 times higher.

TABLE 5.—Persons charged (held for prosecution) with drunkenness, driving while intoxicated, and disorderly conduct, in 1,214 cities, by geographic regions, 1939

[Population estimated as of July 1, 1933, by the Bureau of the Census]

Geographic region	Number of cities	Population	Offense charged					
			Drunkenness		Driving while intoxicated		Disorderly conduct	
			Number	Rate per 100,000 of total population	Number	Rate per 100,000 of total population	Number	Rate per 100,000 of total population
New England.....	119	4,542,057	95,506	2,102.7	3,496	77.0	3,937	86.7
Middle Atlantic.....	325	7,914,277	78,645	993.7	3,281	41.5	28,704	362.7
East North Central.....	317	13,824,006	136,800	989.6	12,796	92.6	36,643	265.1
West North Central.....	148	4,171,763	52,006	1,246.6	4,035	96.7	15,370	368.4
South Atlantic.....	65	2,700,503	86,381	3,198.7	6,050	224.0	42,505	1,574.0
East South Central.....	19	462,775	13,485	2,913.9	907	196.0	3,427	740.5
West South Central.....	54	2,413,013	57,371	2,377.6	2,058	85.3	18,944	785.1
Mountain.....	45	726,741	13,416	1,846.0	1,130	155.5	4,031	554.7
Pacific.....	122	2,391,962	58,900	2,462.4	7,743	323.7	5,856	244.8

Sources: Uniform Crime Reports, First Quarterly Bulletin, 1940, Volume XI, No. 1, Federal Bureau of Investigation, U. S. Department of Justice.

TABLE 6.—Arrests for alcoholic intoxication and deaths resulting from alcoholism in selected cities, 1935-39

Year	Arrests for alcoholic intoxication, ¹ rate per 100,000 of population					Deaths from alcoholism, ² rate per 100,000 of population				
	Baltimore	Boston	New York	Philadelphia	Washington, D. C.	Baltimore	Boston	New York	Philadelphia	Washington, D. C.
1935.....	358.9	5,148.2	86.3	2,700.7	3,899.5	3.1	17.0	6.0	3.5	4.4
1936.....	350.8	5,259.6	79.8	2,422.8	3,222.5	2.9	15.6	6.2	3.1	6.1
1937.....	390.0	5,923.0	66.3	1,992.3	3,105.3	3.7	16.2	5.3	1.9	5.3
1938.....	327.0	5,293.9	98.3	1,761.1	2,904.3	2.6	15.7	4.3	2.5	3.3
1939.....	330.7	5,171.0	111.9	1,608.0	2,987.0	1.9	16.4	4.5	2.4	3.9

¹ Information furnished by the police departments of the respective cities shown.

² Information furnished by the health departments of the respective cities shown.

HOSPITALIZATION FOR ALCOHOLIC POISONING

An idea of the prevalence of serious disabling alcoholism may be had from a study of patients hospitalized for alcoholic poisoning in some

of the large cities. This is especially true where patients urgently in need of attention are treated in hospitals rather than in jails. The hospital figures from two cities, New York and Washington, D. C., are illuminating. A comprehensive study of the prevalence of alcoholism, as revealed by hospital treatment, is presented in the work of the Research Bureau of the Welfare Council of New York City.³ Studying the records of all discharges from 113 municipal and voluntary hospitals in the city in 1933, but omitting State hospitals, it was found that 15,576, or 2.7 percent, of the total number of patients discharged were diagnosed as suffering from alcoholic poisoning. Of this number, 10,527 (67 percent) were reported with the single diagnosis of alcoholism. The remainder were reported as also suffering from various complicating conditions, such as fracture, brain trauma, stab or gunshot wound, superficial injuries, and other or unspecified conditions. Of the total alcoholic patients, 1,355 (8.7 percent) were readmitted to the same hospital during the year, making 14,221 different alcoholic patients discharged during the year. It is possible that a few of these were not chronic alcoholics; but if we accept the number as accurate and apply the same rate to the country as a whole, there would have been 252,361 chronic alcoholics in the United States during that year. There are, of course, several errors in any such assumption. In the first place, all the chronic alcoholics would not be treated in any one year, and, in the second place, the New York figures would not necessarily apply to the country as a whole. Most of the chronic alcoholics treated at public expense in New York are treated at Bellevue Hospital, and those in Washington at Gallinger Municipal Hospital (table 7).

TABLE 7.—*Alcoholic admissions to Bellevue Hospital (New York) and Gallinger Municipal Hospital (Washington, D. C.), 1935-39*

Year	Bellevue Hospital ¹		Gallinger Municipal Hospital ²	
	Number	Rate per 100,000 of population	Number	Rate per 100,000 of population
1935.....	9, 148	127. 2	1, 246	211. 8
1936.....	11, 956	165. 3	1, 407	232. 2
1937.....	11, 393	156. 5	1, 233	197. 8
1938.....	12, 084	165. 0	1, 208	188. 4
1939.....	12, 019	163. 1	1, 347	204. 5

¹ Information furnished by Dr. Norman Jolliffe, Bellevue Hospital.

² Information furnished by the Superintendent, Gallinger Municipal Hospital.

In 1933, when the special study was made in New York by the Welfare Council, there were 9,542 alcoholic admissions to Bellevue Hospital. In 1939 there were 12,019 admissions, giving a rate of 163.1 per 100,000 population of New York City. In 1939 there were 1,347

³ Fraenkel, Marta: Hospitalized patients with alcohol poisoning. *Quart. J. of Studies on Alcohol*, 1: 246 (1940).

alcoholic admissions to Gallinger Municipal Hospital, Washington, giving a rate of 204.5 per 100,000 population. Figures for readmissions to Gallinger are not available, but the readmissions during any given year are probably offset by patients treated elsewhere. If we apply the Gallinger rate to the country as a whole we have, for the United States, 268,043 patients urgently in need of treatment for alcoholic poisoning during the year. However, the objections to accepting the Bellevue Hospital rate for the entire country apply with equal force to the Gallinger rate.

On the basis of the Washington figures, the incidence of alcoholism does not differ greatly between white and colored persons. The high percentage of alcoholism in Washington is certainly not due to its large Negro population. In 1930, 27.7 percent of the population were Negroes (1940 census figures not yet available). In 1939, 30.1 percent of arrests for drunkenness were Negroes. That this indication of a slightly higher proportion of drunkenness among Negroes is due to other factors than drunkenness is indicated by the fact that, in this same year, only 19 percent of persons who died in Washington from alcoholism were Negroes and only 19.2 percent of those admitted to Gallinger Municipal Hospital for alcoholism were Negroes.

CRIME

Crimes due to alcohol are of medical as well as legal and social significance, and they indicate to some extent the prevalence of serious alcoholism. The relation between alcoholism and crime has not been given the thorough study that it deserves. The most notable work on the subject was that done by the Committee of Fifty.⁴ Studying 13,402 convictions in 17 prisons and reformatories in 12 States in 1893, the Committee concluded that intemperance figured as one of the causes of crime in 50 percent of the cases and was the sole cause in 16.87 percent. Judge Joseph T. Zottoli, of the Municipal Court of Boston, using a less direct method than that followed by the Committee of Fifty, has made an exhaustive study of the relation between alcoholism and crime in Massachusetts. In a personal communication he states that more than 90 percent of the adult population of prisons in Massachusetts, to which prisoners are sent for misdemeanors, are there because of offenses caused by drunkenness, and that about 50 percent of persons receiving sentences to penal institutions have committed offenses related to alcoholism.

While the figures given for insanity, deaths, hospitalization, arrests, and crimes due to alcoholism, are inadequate to serve as the basis for definite conclusions as to the extent of serious alcoholism in the United States, it would appear safe to assume from them that there are at least 200,000 persons in the country whom alcohol has completely

⁴ Emerson, Haven: *Alcohol and Man*. The Macmillan Company, New York, 1932. Page 315.

mastered, that is, who are chronic alcoholics, or persons who cannot, or will not, control their drinking and who, as a result, have become serious problems to themselves, to their families, and to the community. It also may be safely assumed that at any one time there are in the country 1,000,000 or more persons who, because of excessive indulgence and special susceptibility, are in danger of becoming chronic alcoholics. It is not possible to make even a reasonable estimate of the number of additional persons who are exposing themselves to accidents, disease, and social hazards because of overindulgence in alcohol. The total picture is, however, a large one that deserves the serious attention of health officers as well as social planners in general.

Alcoholism is largely a health problem, but it cannot be divorced from its social and legal features. The whole subject should be approached with a broad viewpoint that admits at once that alcohol is both harmful and useful.

Man seems to be incurably afflicted with a desire to get, by artificial means, more pleasure out of life than it normally gives him. He likes to escape from unpleasant conditions and to have some means of acting childishly without being aware of it. Alcohol is the least harmful of any of the drugs by which he can achieve these results. It affords all grades of relief, from mild and pleasant relaxation after a hard day's work to euphoria that expresses itself by complete and boisterous irresponsibility.

Since complete suppression of the use of alcohol as a beverage has been shown to be impossible, and is probably undesirable, it behooves us to devise means to protect the susceptible and to help the victims of it insofar as this can be done.

In order to approach the problem rationally, it is desirable to have more accurate information about all of its phases, so that better methods of prevention and cure can be devised. Comprehensive studies should be made in order to acquire accurate knowledge as to the prevalence and social consequences of alcoholism, including crimes due to it, and of alcoholic deaths. Such studies will require the cooperation of health officers, peace officers, welfare workers, and hospital executives. A survey should be made of the treatment facilities and the effects on the alcoholic of various methods of handling him. Above all, we need to know more about the fundamental causes of alcoholism and the nature of the physical and mental changes that make users more and more susceptible and less amenable to treatment. The psychologist, the psychiatrist, the internist, and the laboratorian all have a place in this field. In the meantime, we should do the best we can with the knowledge that we have.

The fact that the ratio of male to female alcoholics is six or seven to one clearly indicates that in the majority of instances something besides susceptibility produces chronic alcoholism. The difference is

doubtless due to social customs and the general attitude as to what is right and wrong for the two sexes. There is here a strong suggestion as to the desirability of education about the effects of alcohol that would have as one of its objectives the building up of a public conscience that, by social pressure, would discourage excesses in either sex.

STATE CONTROL

Certain measures of regulation concerning liquor control are also necessary. This is recognized and the various States have adopted different measures that are more or less effective, but which in many cases could doubtless be improved. Two States have complete prohibition, two have prohibition of all liquor save beer, some have State monopolies, some have prohibition and local dispensaries, and there are regulations as to places and time of sale, but in some of the States the control measures seem to be designed more to regulate business than to discourage excessive drinking. Local option is allowed in 34 States, and since the repeal of the more or less ineffective national prohibition in 1933, more than 5,000 communities have returned majorities against the further sale of liquor.

CONTROL IN EUROPE

Alcoholism has been decreasing in most of the European countries, as a result of regulations and a growing sentiment for temperance, and this fact is often cited to prove the superiority of European methods of control. The critics of the American system, or systems, fail to take account of one important factor, namely, that the American people have more leisure to drink and more money to buy alcohol than any other people in the world. We have more deaths from alcohol for the same reason that we have more deaths from automobile accidents. Finland and Norway established prohibition following the last World War and abandoned it after a brief trial for much the same reason that the United States did. Various systems of control are used in Europe, including government monopolies, laws regulating the hours of sale, high tax on spirituous liquors, education of the populace as to the effects of alcohol, pass-book systems, and the like. In Germany there is a strong campaign for temperance, bound up partly with the desire to make the nation more efficient. Education as to the effect of alcohol is stressed and cognizance is taken of the fact that ethical reasons can serve as a substantial factor in winning people from its use. There is no absolute prohibition, but chronic alcoholics may be sterilized under the law for the prevention of morbid heredity.

The best known system of control is the Bratt individual control system, which was put into effect in Sweden in 1914. Under this system pass books are issued to one member of each family, if he has

income sufficient to warrant the purchase of alcoholic beverages. The book must be presented when he buys liquor, and the quantity purchased is recorded by stamp. There is a limit on the quantity that may be purchased, and the book may be withdrawn, temporarily or permanently, for such offenses as drunkenness, reselling purchased liquor, etc. The system does not apply to beer and wine. The maximum amount of spirits purchased per month must not exceed four liters, but on special occasions extra allowances may be granted. The system does not affect the "on" consumption of spirits, but it is stated that from 80 to 90 percent of spirits consumed in Sweden are consumed at home. There is a high degree of cooperation between the public and the officials in the enforcement of the Bratt system, and its introduction was followed by a sharp reduction in the consumption of spirituous liquors and of cases of drunkenness brought before the courts.

The fact that a system of control seems to work in a country with a homogeneous population like Sweden does not necessarily mean that it would be effective in the United States. A system that requires so much cooperation between officials and the public would probably merely afford another avenue for graft in some sections of our own country. The system is also decidedly less effective than systems in effect in some of the States. It has not abolished alcoholism in Sweden. Between 1921 and 1936 the average number of cases of drunkenness brought before the courts in Sweden ⁵ was about 30,000. In 1936 the rate per 100,000 was 489.3. The rate of arrests for alcoholism in New York City and Baltimore (table 6) during the same year was 79.8 and 350.8, respectively. The Swedish rate is six times the New York rate, in spite of the fact that two-thirds of the Swedish people live in rural communities. However, during the same year the Boston rate was eleven times the Swedish rate, so all that can be derived from these figures is that New York has gotten farther away than other places from the rather backward idea that drunkenness is of itself a crime.

PROVISIONS FOR TREATMENT

The provision for treatment of acute and chronic alcoholism is inadequate in practically all parts of the United States. The drunkard is, in many places, arrested and placed in jail until he sobers up. He may then receive a fine or an additional sentence of a few more days in jail. In most cases the procedure is not only useless but harmful, in that the atmosphere of jails tends to dissipate ethical resistance to drunkenness and to other social lapses. In many large cities public hospitals treat the acute alcoholic for a few days and do a good job of it insofar as the immediate attack is concerned.

⁵ Statistic Arsbok for Sverige, 1940.

Some of the States provide for the commitment and treatment of nonpsychotic alcoholics in State hospitals, and such patients are admitted, to a certain extent, to the State hospitals in all States, but in most cases they are not welcome and only a few get in. Several States accept voluntary patients. California and Virginia make more use of their State hospitals for the treatment of nonpsychotic alcoholics than any other State. The laws pertaining to admission provide for admission for a period of 4 months to 2 years. One State provides for commitment not to exceed 12 months, except in the case of dipsomaniacs, who may be committed for 3 years. In actual practice, alcoholics committed to State hospitals are kept from 1 to 12 months, most cases being discharged within 6 months. Provision for the treatment of alcoholics in State hospitals affords some relief for a few extreme cases, but leaves without assistance of any kind that large number of chronic alcoholics who need treatment but have no means of securing it because of lack of funds. Many of these people could be saved if, in the early stage of their chronic alcoholism, they were handled like sick people instead of being treated like criminals or allowed to shift for themselves.

There should be a system of hospitals to which such patients would be admitted on a commitment or voluntary basis, but it would be useless to erect such buildings and then operate them as prisons. They should give the best of medical attention, including outdoor work, and all the activities that go to make up an institution designed to rehabilitate the patients. Punishment beyond that implied in the restraint incident to commitment should have no place in the scheme of treatment. Success in treatment depends largely upon long periods of abstinence, during which the patient learns to adjust himself to difficulties without drink while he is acquiring a different viewpoint and a new set of habits that tend to carry him away from instead of toward temptation after he has been discharged. This can never be accomplished if he is merely confined and treated with neglect, indifference, and hostility, as is the case in so many jails and public hospitals where alcoholic patients are now treated.

The building and proper management of hospitals for chronic alcoholics is probably too much to expect of the smaller States. The ideal solution would be for the Federal Government to assist the larger States with hospitals that would be operated solely by the States, but with such supervision by the Federal Government as would be implied by financial aid. The Federal Government might well build and operate several hospitals for the treatment of voluntary patients from any part of the country. Additional legislation, perhaps beyond the constitutional power of Congress to enact, would be necessary for the Government to treat and hold against their wills cases

committed from different States; hence the necessity for the States to take individual action. Hospitals for alcoholics could well be operated on the same plan as that of the two Federal hospitals for narcotic addicts. These hospitals have tended to take sin and punishment out of narcotic addiction and to place treatment, rehabilitation, and research in the foreground. They have had success beyond expectations, and hospitals for alcoholics operated in the same manner would doubtless also prove worthwhile, both from the treatment and economic standpoints. There should be a follow-up system to bolster the morale of the discharged patients and give psychiatric advice. This should be combined with educational work and the formation of private welfare centers such as have proved so successful in handling drunkards in Switzerland.

In conclusion, alcoholism is a large problem that is poorly handled in many parts of this country by health, welfare, and police agencies. There are needed more comprehensive statistics, more extensive facilities for treatment, a wide dissemination of facts, control measures designed to prevent excesses, and, above all, research into all phases of the subject so that facts may be uncovered that will lead to effective measures of prevention and cure.

HOSPITALS EXISTING SINGLY IN COUNTIES HAVE SIMILAR FINANCIAL STRUCTURE ¹

By JOSEPH W. MOUNTIN, *Senior Surgeon*, ELLIOTT H. PENNELL, *Statistician*, and
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In the United States there are about 900 small hospitals each of which represents the only registered community facility for general or allied special service available in the county where it is situated.² No matter whether these hospitals are controlled by local governments, nonprofit associations, or proprietary agencies, their financial structure is much the same. Regardless of their bed capacity, their geographic location, or the characteristics of the county in which they are located, their financial structure is still of fairly similar pattern. What the pattern is and how it compares with the one descriptive of all hospitals of corresponding classification will be presented in this report.

¹ From the Division of Public Health Methods, National Institute of Health. Study conducted in connection with the National Health Inventory, assistance in the preparation of these materials having been furnished by the personnel of Work Projects Administration Official Project Number 712159-658/9999.

² From tabulations of data contained in the Journal of the American Medical Association, vol. 106, No. 10, March 7, 1936. The term "registered" applies to hospitals approved by the American Medical Association. "Special" service, as used here, is that obtained in hospitals furnishing types of care which are closely identified with general medical and surgical service. Hospitals furnishing such service include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

The hospitals under discussion must be clearly distinguished. It has been said that they represent within their counties the only registered community facilities for general or allied special service. There may be in the same county mental and tuberculosis hospitals, but these are of course definitely circumscribed as to range of service. Occasionally an infirmary unit of an institution, which by nature of its organization restricts its benefits to wards of the institution, may also be located within the county. Possibly, even, there are other general or allied special³ hospitals which for specific reasons are disregarded in this study. Either they are controlled by Federal or State agencies and thus do not represent true community accommodations, or they are not approved for registration by the American Medical Association. Although some of the nonregistered hospitals are probably of considerable importance in meeting definite community needs, they are not included here since information regarding them is so fragmentary that dependable representation of the group cannot be assured. The group selected for analysis is composed, then, of registered county, city, nonprofit, and proprietary hospitals which offer general or particular medical and surgical services, and which of themselves exist without duplicate in a county. For brevity, they will be designated as "single" hospitals, even though the term is not strictly applicable.

From the Business Census of Hospitals conducted by the United States Public Health Service during 1935 were obtained data relative to the financial organization of hospitals.⁴ According to information published by the American Medical Association, there has been but slight change in number of hospitals from 1935 to 1939 and only a moderate expansion in total number of beds.⁵ It is reasonable to say that the financial structure of hospitals during the year 1935 continues to describe very closely the structure in existence today. Extractions from data secured by means of the hospital survey provide the foundation for this study. The coverage of the entire Census was fairly comprehensive, more than four-fifths of the beds contained in registered general and special hospitals having been included in the schedules submitted during the survey. Reporting was less complete, however, for small than for large hospitals, with the result that the single ones, usually very small, are not so fully represented as is the

³ See footnote 2.

⁴ Reports based on the Business Census of Hospitals which contain material related to that presented in this study are listed below:

(a) Pennell, Elliot H., Mountin, Joseph W., and Pearson, Kay: Business Census of Hospitals, 1935. General Report. Supplement No. 154 to the Public Health Reports, U. S. Government Printing Office, 1939.

(b) Pennell, Elliot H., Mountin, Joseph W., and Pearson, Kay: Existence and use of hospital facilities among the several States in relation to wealth as expressed by per capita income. Public Health Reports, Vol. 55, No. 19, May 10, 1940.

(c) Pennell, Elliot H., Mountin, Joseph W., and Pearson Kay: Financial support of hospitals controlled by State and local governments. Public Health Reports, Vol. 56, No. 10, March 7, 1941.

⁵ Journal of the American Medical Association, Vol. 114, No. 13, March 30, 1940.

entire group. Nevertheless, the sample used herein is thought to be adequate as it includes more than one-half of the registered hospitals existing singly and they in turn contain approximately two-thirds of the aggregate beds. It is weighted somewhat with facilities under the supervision of governmental and nonprofit agencies, since replies from institutions so controlled were comparatively more numerous than were those from places under proprietary control.

The sample just described excludes 17 reporting hospitals, most of them nonprofit institutions, which are located alone in counties definitely metropolitan in character. As the existence of these hospitals represents an atypical situation, it was felt that a discussion of community facilities that are frequently the only readily accessible ones would be more to the purpose if these institutions were omitted. Each of them is situated in a county that is part of a large population center where there are numerous hospital facilities.

In this analysis, agency in control serves as a constant base for classification. County governments, city governments, and the two in combination constitute the local official agencies that provide means for hospitalization. Churches, fraternal orders, and similar groups not organized on a profit-sharing basis make up the nonprofit classification. Individuals, partnerships, and profit-sharing corporations compose the proprietary agencies engaged in hospital operation. One-seventh of the hospitals existing alone which reported in the Census are controlled by local governments, about one-half by nonprofit organizations, and the remainder, slightly more than one-third, by proprietary agencies. Distribution of beds in reporting hospitals differs slightly from the distribution of institutions. Nonprofit hospitals contain two-thirds of all beds reported, thereby proving themselves above average in size; and proprietary ones contain little more than one-fifth of the beds reported, thus proving themselves of relatively small capacity. The proportion of beds maintained by local governments equals the proportion of hospitals so maintained.

As supplements to the discussion which follows, one chart and five tables are included in the text. In each, it will be noted that the agency controlling the institution constitutes, as stated earlier, the primary classification of hospitals for an analysis of their means of support. Throughout the several investigations, sources of income used for operating purposes are designated as "patients," "taxes," and "other." All sums received from patients, both bed and ambulatory, constitute the first-named source. Government appropriations, emergency and otherwise, except those devoted to plant improvement, are classified as income from taxes. In the source denoted "other" are included earnings from endowments, donations from charitable organizations, and miscellaneous receipts. Both the chart and the tables permit comparison of the financial set-up of particular classes of

hospitals taken as a whole with that of corresponding classes of hospitals which exist alone in counties. It is recognized that in some instances the composition of the corresponding classes is probably such that they are not strictly comparable, as, for example, the composition of certain size categories; however, there is beyond doubt sufficient resemblance among the groups of like classification that effective comparison may be made.

Earlier articles have given evidence that in many instances a large part of the burden of support for local governmental hospitals is borne directly by patients.⁶ The cardinal point revealed by this study—that city and county hospitals existing singly are supported in practically the same manner as are voluntary hospitals—confirms in greater detail the evidence already produced. Figure 1 and table 1 emphasize the parallelism in plans of support which prevails among governmental, nonprofit, and proprietary hospitals existing alone. Also they reveal the striking dissimilarity between the financial schemes of governmental hospitals in the aggregate and of those of single existence. According to previously established figures,⁷ governmental hospitals controlled by local agencies receive 14 percent of their revenue from patients and 84 percent from taxes. In extraordinary contrast, the group of these hospitals which exist alone obtains 76 percent from patients and 21 percent from taxes—practically a reversal of proportions. The slight fraction from miscellaneous sources is nearly the same for each group.

TABLE 1.—Percentage distribution of income by source for all registered general and special¹ hospitals of specified control, and for hospitals of like classification existing singly in counties

Control of hospital	Percentage of income from specified source							
	All hospitals				Hospitals existing singly in counties			
	Total	Patients	Taxes	Other	Total	Patients	Taxes	Other
Local governments.....	100.0	14.4	83.6	2.0	100.0	76.1	21.4	2.5
Nonprofit agencies.....	100.0	70.9	10.3	18.8	100.0	80.9	8.3	10.8
Proprietary agencies.....	100.0	91.4	4.2	4.4	100.0	90.4	6.2	3.4

¹ "Special" hospitals, as used here, are hospitals furnishing types of care which are closely identified with general medical and surgical service. These hospitals include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

If singleness of existence completely recasts the plan of support for governmental hospitals, what changes may be expected among voluntary hospitals, which are of course chiefly patient-supported? Need for hospitalization of persons in straitened circumstances might neces-

⁶ Plumley, Margaret Lovell: Organization and Financial Policy of City and County Hospitals. Transactions of the American Hospital Association, Forty-First Annual Convention, 1939, vol. 41, p. 470. See also footnote 4.

⁷ See footnote 4 (c).

sitate governmental subsidization of single nonprofit or proprietary hospitals to the point that proportions of revenue from taxes would be appreciably raised. Such possibility is denied by the findings reproduced in the chart and table 1. Actually, the percentage of income originating from patients rises from 71 percent for all nonprofit hospitals to 81 percent for the members of the group that are situated singly. The proportion from taxes shows small decline for the single

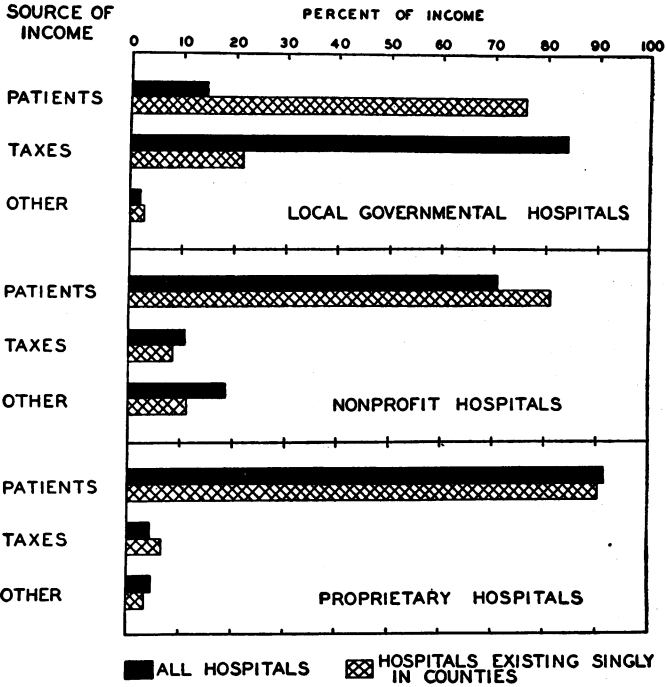


FIGURE 1.—Percentage distribution of income by source for all registered general and special hospitals of specified control, and for hospitals of like classification existing singly in counties.

institutions. Nonprofit hospitals in the aggregate draw almost one-fifth of their income from miscellaneous sources; those existing apart from others draw only one-tenth from such sources. The scheme of support for single hospitals under proprietary control coincides so closely with that for the whole rank of proprietary hospitals that differentiation is pointless. It is sufficient to say that more than nine-tenths of the revenue for each of the two groups is supplied by patients.

With this comparison completed, it may be well to review the percentages in order to stress the similarity of financial structure characterizing single hospitals. While the percentages expressing income from patients for all hospitals vary from 14 to 91 for the 3 control groups,

those descriptive of single hospitals range only from 76 to 90. Spans in the percentages stating income from tax funds are comparable to those just described. There is, of course, less divergence among the smaller percentages showing income from other sources. By way of summary, the financial structure of single hospitals under the three separate controls may be thus outlined: At least three-fourths of all receipts for each control group are derived from patients; a maximum of one-fifth comes through the channel of government appropriations; and not more than approximately one-tenth for any group is obtained from other sources.

Examination of the financial structure of hospitals representing the sole community facility was not limited to each control group taken as a whole. In order to determine the influence of certain characteristics, both of the hospital and of the community containing it, on means of support, several detailed types of investigation were undertaken. First, single hospitals of the three control groups were classified according to bed capacity and then analyzed as to origin of income; later, the same analysis was made of the three control categories classified according to certain external factors such as geographic location, and population and metropolitan character of counties wherein these hospitals are situated. Certain of the findings are supplied in tables 2 to 5. It may be repeated that data are also provided in the tables which continue the comparison between the financial set-up of single hospitals and that of hospitals in the aggregate.

As stated earlier, single institutions are of small capacity, averaging less than 40 beds each. For convenience of discussion, these hospitals are divided into three groups—less than 25 beds, 25 to 49 beds, and 50 to 149 beds. The three single hospitals exceeding a capacity of 149 are omitted from the study concerning size. The classes thus formed are in the main comparable with preestablished ones covering all hospitals. According to table 2, single hospitals of official control show no consistent trend in relation to changing bed capacity, inasmuch as the middle-sized group receives relatively more income from patients and less from taxes than does either of the other size groups. Of particular interest is the fact that single hospitals of small capacity which are controlled by local governments receive from patients the same percentage of their receipts as do all hospitals of similar size and control. Among larger hospitals the ratios stating income by source are divergent for institutions occurring singly and for those occurring both in multiple and singly. Hospitals existing alone which have a bed capacity of 25 or more receive a notably larger fraction of their income from patients than do the aggregate hospitals of like size.

TABLE 2.—Percentage distribution of income by source for all registered general and special¹ hospitals of specified control and bed capacity, and for hospitals of like classification existing singly in counties

Control and bed capacity of hospital	Percentage of income from specified source							
	All hospitals				Hospitals existing singly in counties			
	Total	Patients	Taxes	Othe	Total	Patients	Taxes	Other
Local governments:								
Less than 25.....	100.0	65.7	31.0	3.3	100.0	65.3	34.2	0.5
25 to 49.....	100.0	68.1	28.4	3.5	100.0	80.1	18.0	1.9
50 to 149 ²	100.0	45.9	52.0	2.1	100.0	73.5	22.5	4.0
Nonprofit agencies:								
Less than 25.....	100.0	67.5	6.9	25.6	100.0	75.0	9.4	15.6
25 to 49.....	100.0	69.4	8.5	22.1	100.0	80.0	9.9	10.1
50 to 149 ²	100.0	74.2	9.2	16.6	100.0	81.3	7.9	10.8
Proprietary agencies:								
Less than 25.....	100.0	91.5	4.2	4.3	100.0	86.1	6.8	7.1
25 to 49.....	100.0	90.5	4.0	5.5	100.0	90.9	7.1	2.0
50 to 149 ²	100.0	91.5	4.3	4.2	100.0	96.2	3.4	.4

¹ "Special" hospitals, as used here, are hospitals furnishing types of care which are closely identified with general medical and surgical service. These hospitals include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

² The size interval "50 to 149" is used in order to facilitate comparison of hospitals of similar size, percentages describing all hospitals having previously been obtained for this interval. The three single hospitals which exceed a bed capacity of 150 are omitted from this particular analysis.

Little variation in sources of revenue occurs among the different size groups of single nonprofit hospitals. The smallest draw 75 percent from patients, the medium-sized ones 80 percent, and the largest 81 percent. Without exception these percentages are appreciably higher than those describing matching composite groups. Proprietary hospitals existing alone, like nonprofit hospitals of similar situation, show small increase in proportions of revenue from patients as bed capacity is expanded. The percentages range from 86 to 96. Remarkable congruity prevails in the financial set-up of proprietary hospitals occurring singly and of proprietary hospitals in mass. From these findings the obvious deduction concerning each control group is that the internal factor of size is but loosely associated with variations in means of support for single hospitals.

For the investigation of the possible weight of external factors on plans of support, hospitals of each control classification were, as an initial step, divided into four groups on the basis of their geographic location. Natural boundaries as well as economic conformity of States entered into the establishment of the four areas³ which have

³ The estimated population of each area as of July 1, 1935, and the States included in each are as follows: Northeastern (33,261,000): Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern (37,576,000): Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central (39,300,000): Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Western (12,384,000): Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

been used in the analysis of data from the Hospital Census. All States, including the District of Columbia, which lie above the Potomac River and east of the State of Ohio constitute the Northeastern area. The region lying below the Potomac and Ohio Rivers and extending as far west as New Mexico is considered Southern. The block of States beginning with Ohio on the east, which is situated almost directly above the Southern area, makes up the Central region. The Western comprises all States from the first mountainous tier to the Pacific coast.

In regard to scheme of support, hospitals representing the sole community facility exhibit from area to area rather pronounced differences. Hospitals in the Western region, with only 56 percent of their income from patients, represent the lower extreme among local governmental institutions; those in Central States, with 83 percent from patients, represent the upper limit. Inequalities also prevail in the percentages from taxes, with a low of 14 for the South and a high of 44 for the West. Only minute fractions of the revenue for governmental hospitals are derived from miscellaneous sources except in the South where one-tenth is so obtained. The gulf is wide between single and aggregate hospitals controlled by local governments. In each area, the proportion secured from patients is decidedly greater and the proportion from taxes decidedly smaller for single hospitals than for the entire group.

TABLE 3.—Percentage distribution of income by source for all registered general and special¹ hospitals of specified control and location,² and for hospitals of like classification existing singly in counties

Control and location of hospital	Percentage of income from specified source							
	All hospitals				Hospitals existing singly in counties			
	Total	Patients	Taxes	Other	Total	Patients	Taxes	Other
Local governments:								
Northeastern.....	100.0	9.9	87.7	2.4	100.0	70.7	28.9	0.4
Southern.....	100.0	33.4	60.9	5.7	100.0	76.7	14.2	9.1
Central.....	100.0	22.0	77.1	.9	100.0	83.1	15.3	1.6
Western.....	100.0	5.9	93.1	1.0	100.0	56.2	43.8	(³)
Nonprofit agencies:								
Northeastern.....	100.0	61.7	14.8	23.5	100.0	73.6	10.0	16.4
Southern.....	100.0	78.0	6.0	16.0	100.0	77.7	7.2	15.1
Central.....	100.0	80.5	6.3	13.2	100.0	86.8	8.1	5.1
Western.....	100.0	82.6	3.4	14.0	100.0	85.6	7.2	7.2
Proprietary agencies:								
Northeastern.....	100.0	86.9	5.8	7.3	4 100.0	4 51.1	4 11.6	4 37.3
Southern.....	100.0	95.3	2.2	2.5	100.0	94.2	3.5	2.3
Central.....	100.0	87.1	7.8	5.1	100.0	88.6	9.6	1.8
Western.....	100.0	95.0	1.9	3.1	100.0	88.5	6.1	5.4

¹ "Special" hospitals, as used here, are hospitals furnishing types of care which are closely identified with general medical and surgical service. These hospitals include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

² See footnote 8 in text.

³ Less than 0.05 percent.

⁴ Representing only 3 hospitals.

Again, this time in the case of single nonprofit institutions, it is the Central region in which the largest proportion of revenue comes directly from patients. The West is a close second. The lowest proportion from payments by patients distinguishes the Northeast. The percentages derived from taxes are similarly small in the separate areas. In Northeastern and Southern States, hospitals acquire somewhat larger fractions of their income from miscellaneous sources than they do in Central and Western States. Between single hospitals and the all-embracing group, resemblance is close. In each area except the Southern, the percentage of income derived by single hospitals from fees of patients exceeds in small degree the percentage so secured by the complete group; the proportions from taxes are almost equal; and the relative sums from other sources are slightly less for single institutions than for those considered in total.

As there are too few single hospitals of proprietary control in the Northeast to justify statistical treatment, that area is excluded from the immediately following discussion. In the other three areas, patients supply 89 percent or more of the receipts for proprietary hospitals. It follows that the sums from taxes and other sources are rather small. If it were possible to superimpose the financial design of single proprietary hospitals on that for proprietary hospitals taken together (excluding, of course, the Northeast), only a few minor deviations could be perceived.

From the foregoing facts, it is obvious that among single hospitals of the three control groups subdivided according to geographic location of the institution no sequence in plan of financial support can be discovered. Fluctuations are not sufficiently great, however, to belie the general statement that hospitals existing alone are alike in financial structure.

The concluding analyses of hospitals existing singly are concerned with the relationship between sources of income and certain attributes of the county containing the hospital. When counties maintaining only one general or special hospital were divided on a population base, almost nine-tenths of them were found to contain fewer than 40,000 inhabitants. The other one-tenth fell in the population interval of 40,000 to 99,999, an interval established for earlier analyses. As may be seen in table 4, county and city hospitals in the smaller counties obtain from individual fees 75 percent of their receipts and from taxes 23 percent; those in the larger counties secure from fees 88 percent and from taxes but 8 percent. The rest of the income, that from unspecified sources, amounts in each instance to less than 5 percent. For nonprofit and proprietary hospitals, location on the basis of county population does not appreciably alter schemes of support. Only among institutions subject to local governments is there marked differentiation between single hospitals and the total group so con-

trolled. Here, even, the difference is not so pronounced for hospitals in the smaller counties as for those in the larger ones.

TABLE 4.—Percentage distribution of income by source for all registered general and special¹ hospitals of specified control in counties of different population range, and for hospitals of like classification existing singly in counties

Control of hospital and population of county	Percentage of income from specified source							
	All hospitals				Hospitals existing singly in counties			
	Total	Patients	Taxes	Other	Total	Patients	Taxes	Other
Local governments:								
Less than 40,000	100.0	65.7	31.8	2.5	100.0	74.6	23.2	2.2
40,000 to 99,999 ²	100.0	44.9	50.5	4.6	100.0	87.6	7.5	4.9
Nonprofit agencies:								
Less than 40,000	100.0	79.3	7.7	13.0	100.0	90.3	8.2	11.5
40,000 to 99,999 ²	100.0	77.0	8.1	14.9	100.0	82.5	8.4	9.1
Proprietary agencies:								
Less than 40,000	100.0	92.1	4.2	3.7	100.0	90.6	6.3	3.1
40,000 to 99,999 ²	100.0	91.6	4.1	4.3	100.0	87.6	5.4	7.0

¹ "Special" hospitals, as used here, are hospitals furnishing types of care which are closely identified with general medical and surgical service. These hospitals include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

² The population interval "40,000 to 99,999" is used in order to facilitate comparison of hospitals located in counties of similar population range, percentages describing all hospitals having previously been obtained for this interval. No hospitals existing singly in counties, except a few (omitted in this study) found in metropolitan areas, are located in counties exceeding a population of 100,000.

Another attribute of counties which suggests the possibility of alteration in the financial scheme of hospitals is proximity to a metropolitan center. For an investigation of the effect of roughly graded distances from a metropolitan area on the sources of income for single hospitals, counties containing such institutions were classified into four groups: metropolitan, first tier, second tier, and third tier and beyond. The metropolitan character of a county is determined by its location in relation to a metropolitan district as identified by the Bureau of the Census. By definition, such a district has an aggregate population of 100,000 or more and contains a city of at least 50,000 inhabitants. Any county in which more than half the population resides within the limits of these established metropolitan districts is classified as metropolitan. Counties adjoining those which are of metropolitan classification are designated as first tier; those once removed are described as second tier; and the remainder are identified as third tier and beyond.

It will be recalled that the few hospitals located singly in metropolitan counties are discarded from this analysis since they can hardly be considered the only readily accessible facilities. Most of the metropolitan counties that have but one hospital are, in part, suburban areas of large cities which probably contain sufficient facilities so that provision of additional ones in these immediately adjacent counties has not seemed feasible. Furthermore, in such areas, travel for those who need hospital care is easier and probably less expensive than it

is in more out-of-the-way counties; hence the problem of accessibility is reduced.

As might be expected, hospitals located singly are most frequently found in counties that are third tier or beyond. In fact, two-thirds of the reporting hospitals are so located, and the remainder are roughly divided between first- and second-tier counties. Striking uniformity in plan of support characterizes hospitals of similar control located in counties of the several tiers. On an average, single hospitals under the management of local governments received 76 percent of their income from patients (table 1). The component percentages (table 5) reach but from 78 for hospitals in first-tier counties to 75 for those in counties three or more tiers removed. Almost as close agreement prevails among both nonprofit and proprietary hospitals, regardless of their distance from metropolitan districts.

TABLE 5.—Percentage distribution of income, by source, for all registered general and special¹ hospitals of specified control in counties of different metropolitan character,² and for hospitals of like classification existing singly in counties

Control of hospital and metropolitan character of county	Percentage of income from specified source							
	All hospitals				Hospitals existing singly in counties			
	Total	Patients	Taxes	Other	Total	Patients	Taxes	Other
Local governments:								
First tier.....	100.0	42.1	53.1	4.8	100.0	77.6	20.4	2.0
Second tier.....	100.0	52.0	46.9	1.1	100.0	77.0	22.3	.7
Third tier and beyond.....	100.0	60.9	33.1	6.0	100.0	74.7	21.6	3.7
Nonprofit agencies:								
First tier.....	100.0	71.0	9.7	19.3	100.0	75.5	9.4	15.1
Second tier.....	100.0	80.4	8.2	11.4	100.0	79.0	6.5	14.5
Third tier and beyond.....	100.0	80.2	7.8	12.0	100.0	83.7	8.5	7.8
Proprietary agencies:								
First tier.....	100.0	90.7	4.8	4.5	100.0	94.8	4.8	.4
Second tier.....	100.0	91.8	6.0	2.2	100.0	88.1	6.7	5.2
Third tier and beyond.....	100.0	91.8	3.5	4.7	100.0	90.0	6.4	3.6

¹ "Special" hospitals, as used here, are hospitals furnishing types of care which are closely identified with general medical and surgical service. These hospitals include maternity, industrial, isolation, eye-ear-nose-throat, orthopedic, children's, and others offering similar specialized types of care. Mental and tuberculosis hospitals are not included.

² Counties in which more than half of the population resides in a metropolitan district, as defined by the Bureau of the Census, are considered "metropolitan." Adjoining counties are called "first tier," those once removed "second tier," and the remainder "third tier and beyond." Hospitals existing singly in metropolitan counties are excluded since the circumstances of their existence are somewhat anomalous.

Other community factors, such as wealth and population density, might be used as the basis for further investigation, but the analyses already undertaken are sufficient to demonstrate the consistent resemblance in the financial plans of all hospitals which represent the only registered community facility within the county. Variation in bed capacity is accompanied by almost no change in sources of income. From one geographic region to another there is limited diversity in scheme of support, the chief difference occurring in the Western area. Neither population nor metropolitan character of the encompassing

county appears to alter especially the financial set-up of hospitals. Since each of these factors has previously been shown to be in some measure instrumental in shaping the financial policy of hospitals in the aggregate, their failure to bring about appreciable change in the fiscal plans of single hospitals is of particular interest.

In this study it was found that when hospitals controlled by city or county governments are located singly in counties, they take the financial character of voluntary institutions; that the nonprofit hospitals existing alone are even more completely supported by patients than are total nonprofit hospitals; and that in plan of support the proprietary hospitals are unchanged by singleness of existence. The striking similarity in the financial structure of each control group lies in the fact that these hospitals representing the sole community facility have but one notable source of income—fees collected directly from patients.

What, specifically, are the implications in these findings regarding the means of support for single hospitals? Other reports based on the Business Census of Hospitals, several of which were cited in this study, have pointed out that dependence upon patients for a great measure of support means that the availability of hospitals is considerably lessened. From a review of previous investigations, this is the story which takes form. Rates of occupancy fall lower as proportions of income from patients grow larger. If more than half of the hospital income consists of fees paid by patients, about half of the beds remain unoccupied. The same areas which reveal low occupancy rates among hospitals, that is, those with small populations, with few hospital facilities per person, and with low per capita income, also reveal comparatively few days of hospital care per unit of population. It may be added in this connection that the farther hospitals are removed from metropolitan areas, the greater the extent to which they rely on patients for their upkeep.

Into the outline of that story, single hospitals may be fitted with precision. Such impediments to satisfactory operation are particularly characteristic of hospitals existing alone in counties. Depending upon individual fees for more than three-fourths of their income, they are very poorly occupied. Beyond doubt they care for only a fraction of the persons within range of service who would be benefited by hospitalization. In many instances their distance from population centers, hence from hospital centers, intensifies the need that they be made more generally available within their communities. From each of the foregoing statements the inference is the same. If improvement in possibilities for hospitalization in such areas is to come within a reasonable time, it must come in great part through revision of the prevailing financial organization.

HUMAN RIBOFLAVIN REQUIREMENT ESTIMATED BY URINARY EXCRETION OF SUBJECTS ON CONTROLLED INTAKE¹

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Studies on the human urinary excretion of riboflavin have been reported by Helmer (1, 2), Emmerie (3, 4, 5), Roscoe (6), Ferrebee (7), Spies, Bean, Vilter, and Huff (8), and Klein and Kohn (9). Emmerie found a daily excretion in men of 819 to 1,250 micrograms and observed increased excretion on increased intake. In one individual after a restricted riboflavin intake the excretion dropped from 650 micrograms to 300 to 400 micrograms daily. Hogan (10) has estimated the human riboflavin requirement at 2 to 3 milligrams a day on the basis of Emmerie's data. Ferrebee found that riboflavin excretion in general depended on the riboflavin intake, and the excretion in 5 normal subjects eating their usual diet varied from 700 to 1,700 micrograms per day.

Following the reports on the symptoms of riboflavin deficiency in humans (11, 12, 13, 14, 15, 16, 17) it appeared desirable to have additional information on the human requirement for riboflavin. We therefore undertook a riboflavin balance study on 10 women under institutional care. Four of the subjects were receiving the ration of cornmeal, cowpeas, casein, lard, and syrup with suitable supplements which has been previously described in detail by Sebrell and Butler (13). Six were receiving a ration similar to that used by Goldberger and Wheeler and reported in detail by Walker and Wheeler (18). One of these subjects also received 30 milligrams of nicotinic acid daily, 2 a daily supplement of 5 milligrams of nicotinic acid, and another 1.0 milligram. Another received daily supplements of 3.3 milligrams of thiamine and 30 milligrams of ascorbic acid. Both of the rations are low in riboflavin, and it was determined by assay that they contain approximately 0.5 milligram of riboflavin per 2,400 calories. The average daily dietary intake of riboflavin was calculated for each subject on the basis of the daily food intake. The rations were accurately prepared by a dietitian and the quantity served and left on the plate was calculated for each subject at each meal.

All subjects were depleted for 131 to 254 days during which time the only riboflavin received was that in the ration. Following this depletion period varying amounts of riboflavin were given once daily by mouth.

¹ From the Division of Chemotherapy, National Institute of Health.

The riboflavin excreted in the urine was determined by the microbiological assay method of Snell and Strong (19). When necessary, correction was made for the inhibiting effect of urea on the assay by the method of Isbell, Wooley, and Fraser (20).

Twenty-four hour urine specimens were collected and transferred to brown bottles kept in the refrigerator. The quantity was measured, and the urine made acid to congo red paper with concentrated sulfuric acid. An aliquot was placed in a small brown bottle, heated on a water bath for 30 minutes and shipped to the laboratory (usually 48 to 72 hours en route). Specimens were then kept in the refrigerator until assayed. Assays were made from 1 to 14 days after collection except in certain instances when repetitions of the assays were necessary. Control assays showed no appreciable loss of riboflavin in urine in a month's time under these conditions of collection and preservation.

As controls, 7 consecutive daily determinations of the riboflavin content of the urine of 3 women and 2 consecutive daily determinations on the urine of 4 women on an institution diet gave riboflavin values varying between 130 and 810 micrograms per day with an average daily urinary excretion of 357 micrograms; 21 determinations of the riboflavin content of the urine of 11 men on their usual diets gave values of 234 to 1,740 micrograms per day.

During the depletion period 6 of the 10 subjects (3 on each ration) developed symptoms of ariboflavinosis as manifested by cheilosis with fissures at the angles of the lips. These symptoms appeared between the 89th and 232d days of observation. The remaining 4 subjects showed milder symptoms such as pallor at the angles of the lips, slight denudation of the mucosa of the lips and slight seborrheic changes around the nose at the time riboflavin supplements were started. However, these lesions had not progressed far enough for a diagnosis of ariboflavinosis to be made. The cheilosis completely disappeared while the various riboflavin supplements were being given for the purpose of studying the variations in the urinary excretion level. Two with the mild symptoms which never progressed to fissuring at the angles of the mouth continued to show some of these very slight abnormalities at the end of the study and their significance is questionable. The amounts of riboflavin given and the quantity excreted are shown on the individual charts. During the depletion period the riboflavin excreted in the urine varied from 30 to 168 micrograms per day and the daily average was 77 micrograms. The greatest individual variation during this period was from 44 to 168 micrograms per day. While cheilosis was present in the 6 subjects, and before riboflavin was given, the urinary excretion varied from 24 to 119 micrograms per day with a daily average of 74 micrograms. The individual charts show a close relationship between riboflavin intake and excretion similar to that reported by Emmerie (4) and Ferrebee

(7). Following the administration of riboflavin there was a steplike increase in excretion, the rapidity of which depended on the amount given and which finally reached a fairly constant level for that particu-

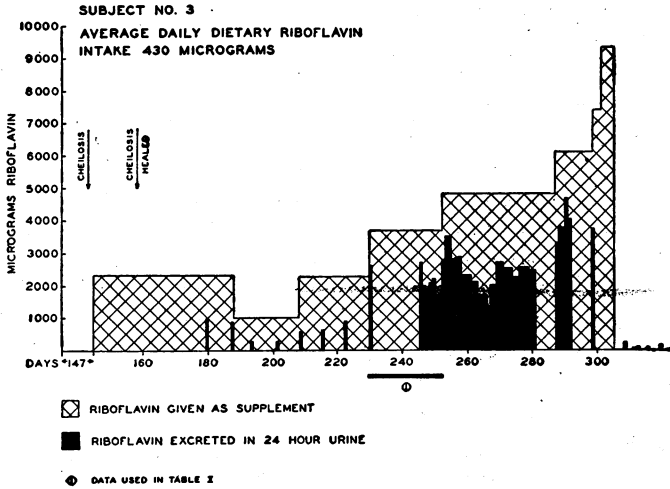


FIGURE 1.

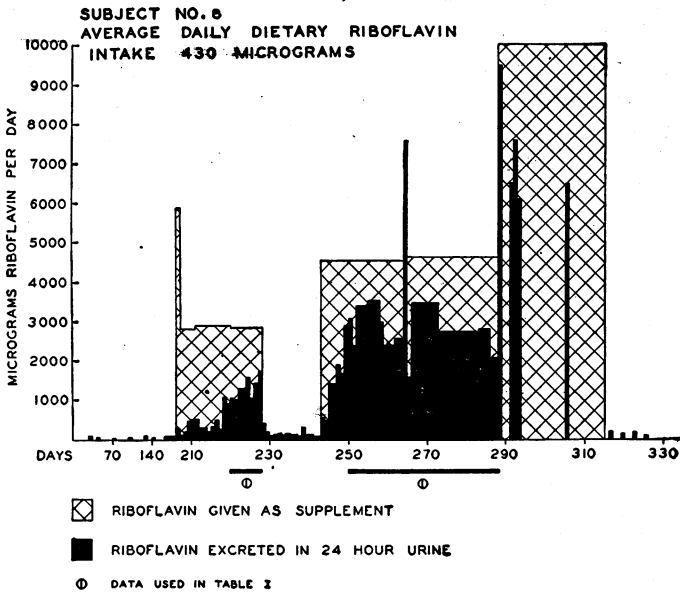


FIGURE 2.

lar amount of riboflavin. Thus subject 46 received a daily supplement of 2 milligrams of riboflavin and the daily urinary excretion rapidly increased from 36 micrograms to 1,484 micrograms in 20 days. On increasing the supplement to 4.2 milligrams the excretion

increased at once and the average daily excretion increased to 3,076 micrograms. The supplement was decreased to 2.2 milligrams and the average daily excretion decreased to 1,265 micrograms. On discon-

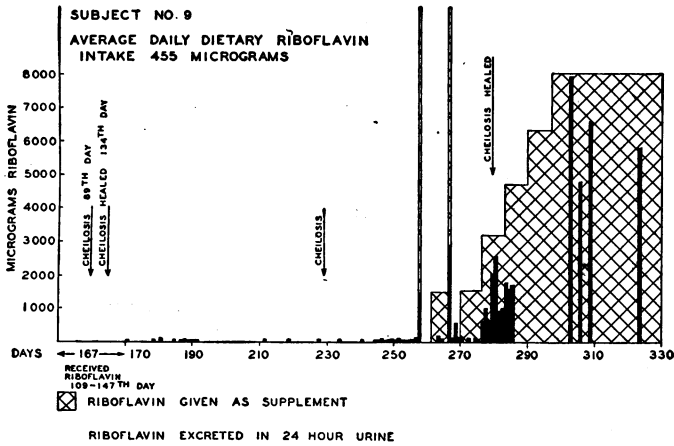


FIGURE 3.

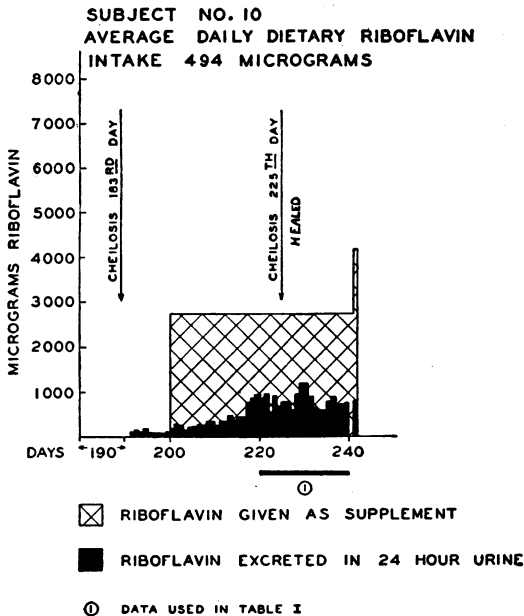


FIGURE 4.

tinuing the riboflavin supplement entirely the daily urinary excretion dropped in 3 days to 173 micrograms and reached a minimum of 79 micrograms per day. On giving a daily supplement of 3.3 milligrams the urinary excretion rapidly increased to an average of 2,433 micrograms per day.

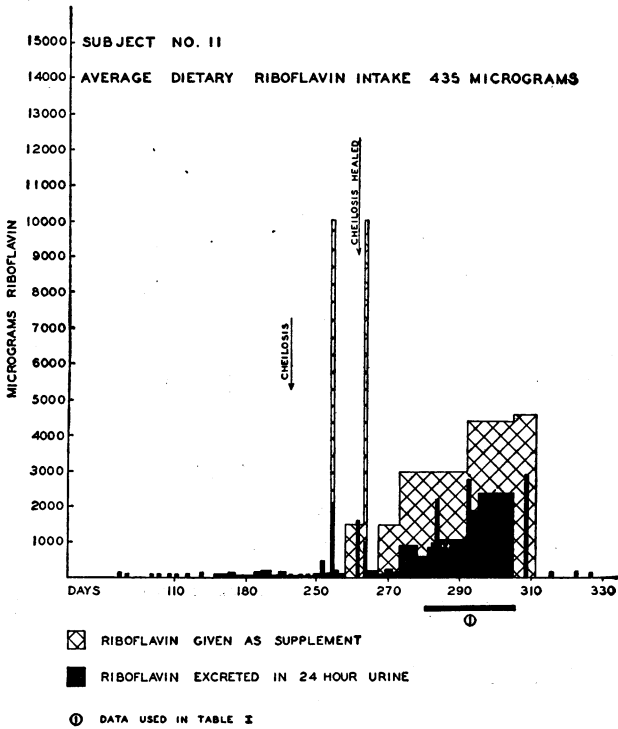


FIGURE 5.

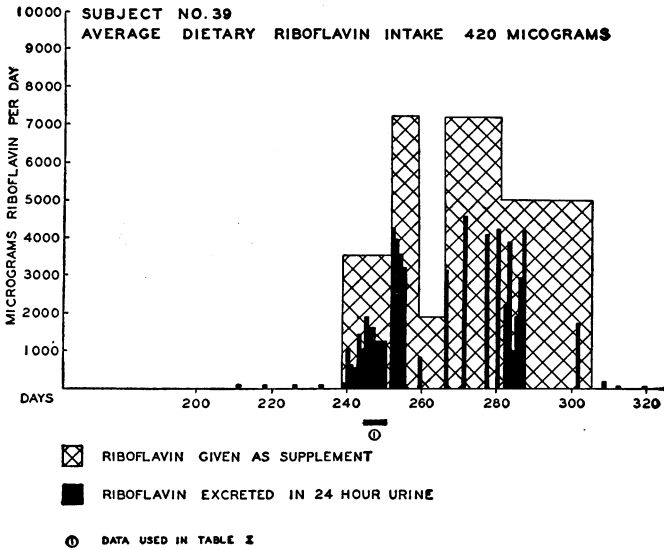


FIGURE 6.

When large amounts of riboflavin were given, such as 5 milligrams per day to subjects 3, 8, and 9, 50 to 80 percent of the amount given

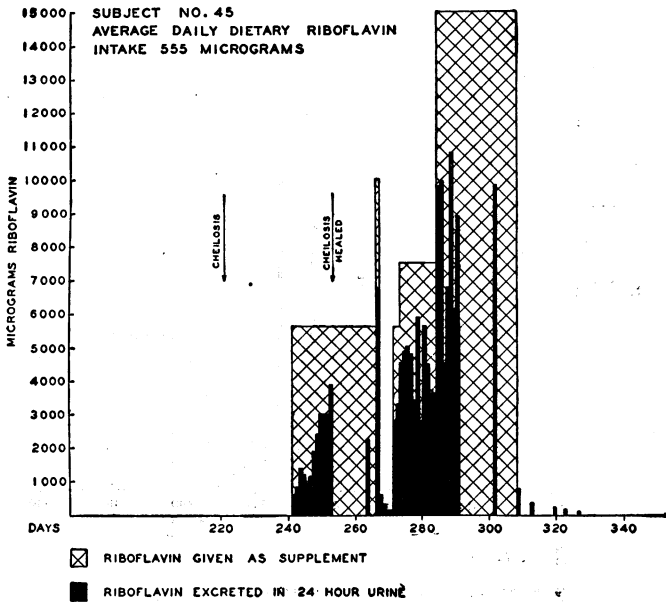


FIGURE 7.

was excreted in the urine. When larger amounts up to 15 milligrams per day were given to subjects 45 and 59 the total quantity excreted in the urine increased but the percentage did not change appreciably.

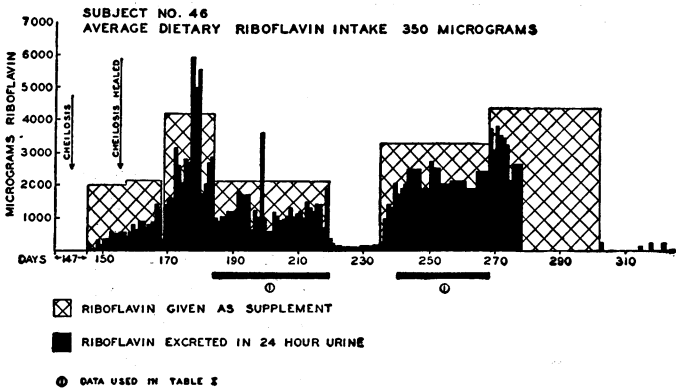


FIGURE 8.

In an effort to calculate the human daily requirement for riboflavin, data are summarized in table 1 from the individual charts. These data show the riboflavin excretion and the riboflavin unaccounted for by urinary excretion during selected periods of riboflavin administration

following the disappearance of the symptoms of ariboflavinosis, and during which the urinary excretion has become fairly constant on a given supplement during 11 periods for eight subjects. The amount of riboflavin unaccounted for by urinary excretion in each subject at the various levels of riboflavin dosage is shown in figure 11. This chart shows a significant increase in the riboflavin unaccounted for between 0.085 and 0.11 milligram (supplement plus diet) per kilogram of body weight. Thus when subjects 3 and 39 were receiving 0.085 milligram

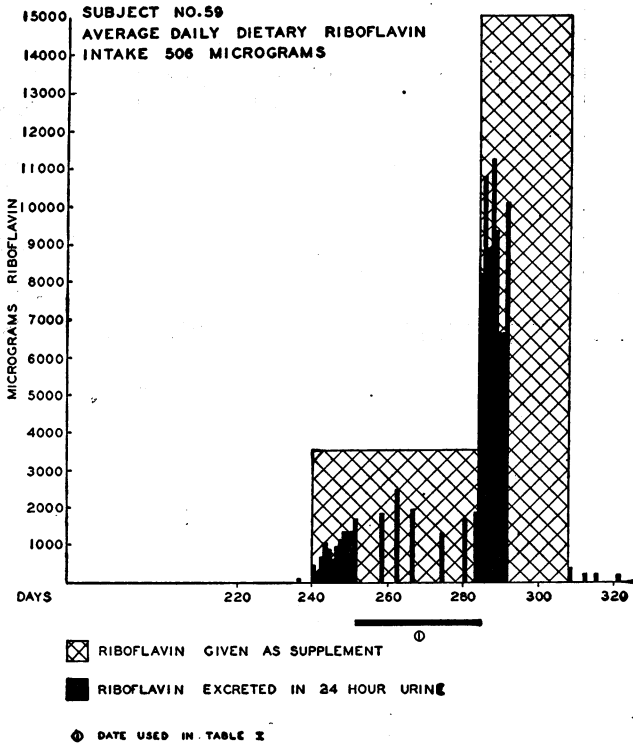


FIGURE 9.

(supplement plus diet) of riboflavin per kilogram of body weight daily, the amount unaccounted for by urinary excretion was 40.5 and 53.0 micrograms per kilogram of body weight per day. On increasing the daily supplement to 0.11 milligram (supplement plus diet) per kilogram of body weight the amount unaccounted for by urinary excretion became 58.5 and 73.0 micrograms per kilogram of body weight, respectively. This suggests that with the larger doses a greater amount of riboflavin is either being destroyed or is not absorbed, and that 0.085 milligram per kilogram of body weight (supplement plus diet) is probably an intake greater than that needed for riboflavin saturation.

TABLE 1.—*Riboflavin intake and excretion*

Subject No.	Weight	Period, days	Average riboflavin intake in diet	Supplement of riboflavin, per day	Total riboflavin intake	Average riboflavin excreted in urine in 24 hours	Riboflavin unaccounted for in urine	Riboflavin not accounted for per kilo body weight
	<i>Kilo-grams</i>		<i>Micro-grams</i>	<i>Micro-grams</i>	<i>Micro-grams</i>	<i>Micro-grams</i>	<i>Micro-grams</i>	<i>Micro-grams</i>
8.....	47.4	232-252	430	3,640	4,070	2,151	1,919	40.5
8.....	61.3	220-227	525	2,830	3,355	1,210	2,145	35
8.....	61.3	260-288	525	4,500	5,125	2,779	2,246	37
10.....	56.3	220-240	494	2,750	3,244	793	2,451	43.5
11.....	59.5	280-292	465	2,950	3,415	975	2,440	41
11.....	59.5	293-305	465	4,600	5,065	2,424	2,641	44.5
39.....	49.2	245-252	420	3,610	4,030	1,410	2,620	53.0
46.....	42.8	189-214	433	2,200	2,633	1,265	1,368	32
46.....	42.8	271-280	358	3,300	3,658	2,433	1,225	28
59.....	48.6	252-284	556	3,470	4,026	1,848	2,178	45
65.....	47	250-281	530	3,510	4,040	2,179	1,861	40

When supplements of 0.025 milligram (plus 0.01 milligram in the basal diet) of riboflavin per kilogram of body weight (1.56 to 2.05

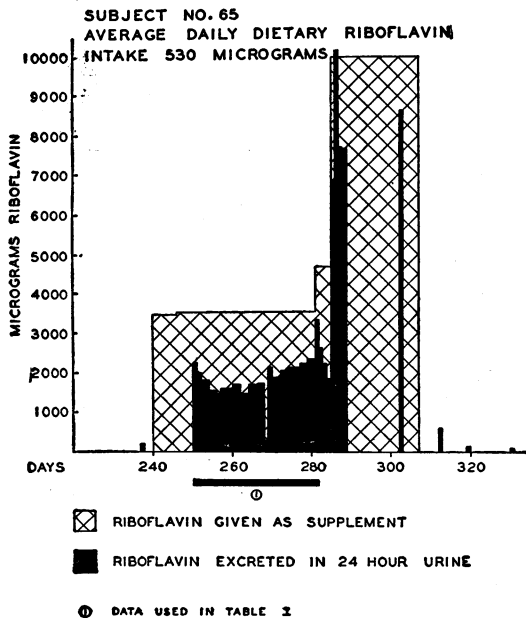


FIGURE 10.

milligram total) were given, the average urinary excretion ranged from 140 to 186 micrograms per day. These figures are lower than the average for the women on the institution diet (357 micrograms). When supplements of 0.05 milligram (plus 0.01 milligram in the basal

diet) per kilogram of body weight (2.54 to 3.68 milligram total) were given, the average urinary excretion varied from 793 to 1,265 micrograms per day, which is higher than the average amount excreted by the women on the institution diet and is within the normal range for men as reported by Emmerie (4) and Ferrebee (7).

Because of the exceptionally large increase in daily urinary excretion which occurred when the 0.05 milligram per kilogram supplement was given, it appears that this amount (in addition to the riboflavin in the basal ration) is probably above the normal requirement while

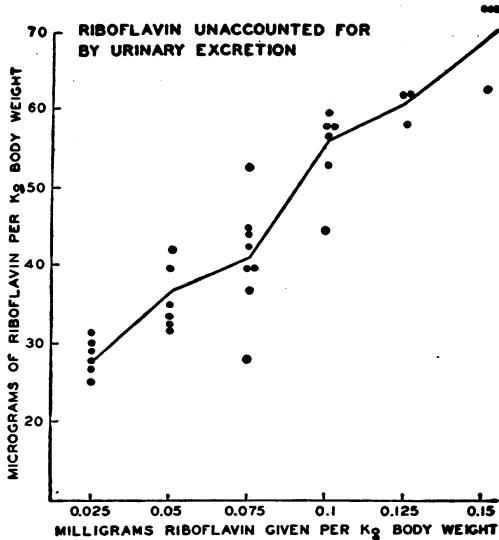


FIGURE 11.

the 0.025 milligram per kilogram dose is marginal or below the normal requirement.

Sebrell and Butler (12) also noted that a supplement of 0.025 milligram per kilogram of body weight was an insufficient amount in the treatment of some cases of ariflavinosis.

The above lines of evidence indicate that 0.035 milligram of riboflavin per kilogram of body weight is not quite enough to meet the adult requirement and 0.06 milligram per kilogram of body weight is slightly above the required amount.

On this basis the daily requirement of an adult would be approximately 3 milligrams.

CONCLUSIONS

Seven women on an institution diet excreted an average of 357 micrograms of riboflavin daily in the urine.

Ten women on rations containing approximately 0.5 milligram of riboflavin per 2,400 calories excreted an average of 77 micrograms of riboflavin daily in the urine.

Data are presented on the urinary excretion of riboflavin which indicate that a daily intake of 3 milligrams is sufficient for an adult.

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BENZENE (BENZOL): ITS TOXICITY AND POTENTIAL DANGERS

Prepared by the DIVISION OF INDUSTRIAL HYGIENE, *National Institute of Health,*
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Benzene (benzol) is a toxic material and should not be confused with benzine, a mixture mainly of aliphatic hydrocarbons. In acute poisoning it acts predominantly as a nerve poison, causing depression of the central nervous system; in subacute and chronic poisoning it

causes, in addition, damage of the blood, the blood-forming organs, and the blood vessels.

Physical-Chemical Properties of Benzene.

Benzene, C_6H_6 , has a molecular weight of 78.11 and a specific gravity of 0.879 at $\frac{20^\circ}{4^\circ}$ C. It is a colorless liquid which solidifies at 5.5° C. and boils at 79.7° C. It is soluble in water to the extent of 0.06 parts per hundred at 20° C. and mixes freely with alcohol and ether. Commercial benzene is seldom pure and may be contaminated with xylene, toluene, phenol, thiophene, carbon disulfide, acetonitrile, pyridine, and other substances (1). Chemically pure benzene has a flash point of -12° to $+10^\circ$ C. The ignition temperature at atmospheric pressure in air is 490° C. and the lower limit for inflammability in percent by volume of vapor in air at atmospheric pressure and ordinary temperature is 1.4, whereas the upper limit is 8 percent (the upper limit not being definitely established). For commercial 90's benzol the lower limit of inflammability is 1.5 percent and the upper limit 9.5 percent (the upper limit not being definitely established). Ignition may be caused by open flames or sparks from electrical appliances.

Maximal Permissible Concentration of Benzene.

The maximal allowable concentration of benzene (benzol) is at present accepted as 100 parts per million ¹ by volume of air (corresponding to 0.32 milligram per liter at 25° C. and 760 mm. Hg) for exposures not exceeding a total of 8 hours daily.

Sources of Exposure to Benzene.

Benzene is used very extensively in a large number of industries.

In the *chemical industry* it is prepared by distillation of coal and coal tar and it is used for the extraction of oils and fats, in the synthesis of organic chemicals such as dyes and their intermediates, in the manufacturing of varnishes, lacquers, stains, and paints, and it is a constituent of certain paint and varnish removers. It is also used in the manufacture of linoleum and celluloid. Hazards of exposure exist also in the manufacture of other plastics and in the blending of motor fuel.

In the *rubber industry* and in many other industries it is used in certain rubber cements; a potential hazard may exist in the manufacture of rubber tires and other rubber articles, straw hats, cardboard boxes, waterproof goods, and in many other trades where this type of cement is used. The same holds true for the *artificial leather industry* where

¹ This figure for the maximal permissible concentration of benzene has been accepted and published by the American Standards Association in its Standards on Allowable Concentrations of Toxic Dusts and Gases—Z37.4—1941. Copies of this standard may be obtained from the American Standards Association, 29 West Thirty-ninth Street, New York City.

it is used with other chemicals as a solvent for nitrocellulose before this is applied to the fabric.

In the *dry cleaning industry* it played a very important role prior to the introduction of chlorinated hydrocarbons for this purpose.

In *intaglio printing establishments* it is used as a cleaning agent for the forms.

Determination of Benzene in Air.

For the determination of benzene in air, samples should be taken wherever there is a known or suspected source of benzene vapors and they should be collected at the breathing level of the workers exposed, especial emphasis being given to the locations nearest the source and those in the path of the air currents carrying the vapors. They should be taken at sufficient intervals of time so that any variations in concentration will be evident, and in sufficient number to avoid any reasonable doubt of the results found. If only one sampling point is deemed necessary, samples should be taken in triplicate, but if numerous locations are to be sampled, representative points may be selected among them.

Benzene may be determined in air by passing it through a nitrating mixture and subsequent distillation with steam of the dinitrobenzene formed. After neutralization of the acid solution the dinitrobenzene may be determined titrimetrically by means of titanous chloride or colorimetrically (Smyth, 1931) (2) or according to the procedure of Schrenk, Pearce, and Yant (1935) (3).

Benzene may also be determined by its adsorption on activated charcoal after acids and moisture have been removed by proper filters, but since this method is not specific it may be used only when no other organic solvents are present in the air. Owing to the size of the adsorption tubes, a similar tube should be used for a counter-balance when weighing (5, 15).

It has also been suggested that benzene and other organic solvents be first condensed in a container surrounded by dry ice and later the benzene be removed by distillation and oxidized with hydrogen peroxide in the presence of ferrous sulfate and colorimetric determinations made (Cook and Ficklen, 1935) (4).

Concentrations of Benzene Determined Under Different Conditions.

Data regarding the determination of benzene in air are not very numerous but the report of Elkins (1939) (6) indicates that such determinations deserve more attention, inasmuch as he found that of approximately 200 determinations made in various Massachusetts industries 68 percent showed concentrations above 75 parts of benzene per million parts of air by volume. Occasionally much higher concentrations may be encountered, as illustrated by the report of Bowditch and Elkins (1939) (7) who found in the compounding room of one artificial leather plant concentrations of 160 and 190 parts per

million, respectively, and in another plant an average of 200 parts per million. Winslow (1927) (11) even found concentrations from 700 to 1,800 parts per million in certain operations.

Absorption and Excretion of Benzene.

Benzene is mainly absorbed by the lungs, but it is only partly excreted in this way and another part of the absorbed material is oxidized in the organism with the formation of phenol and diphenols which in turn are conjugated with sulfuric acid and excreted in the urine, thus reducing the amount of inorganic sulfates.

Determination of Benzene in Blood and Other Tests Indicating Exposure.

The same principles as used in the determination of benzene in air may also be applied to its determination in the blood. In these determinations benzene is removed from the blood by slow aeration, nitrated to dinitrobenzene and determined colorimetrically, as by the method of Schrenk, Pearce, and Yant (1935) (3).

Exposure to benzene may be detected by determining the inorganic and the total sulfates in the urine according to Yant, Schrenk, Sayers, Horvath, and Reinhart (1936) (8). A reduction of the ratio of inorganic over total sulfate indicates the existence of exposure to benzene. As shown by Yant et al. in animal experiments and as found in humans by Bowditch and Elkins (1939) (7), this method is only a true indicator of the intensity of the exposure if performed during or shortly after discontinuation of the exposure.

Relation Between Concentrations of Benzene in Air and Toxic Symptoms.

In regard to the toxic concentrations of benzene for man, many studies (9, 10) refer mainly to acute experiments, as illustrated in table 1.

TABLE 1.—*Acute toxicity of benzene for man*
[Flury, 1928 (10)]

Concentration, parts per million of air	
3,000.....	Tolerated for ½ to 1 hour. Dangerous after ½ to 1 hour. Fatal after 5 to 10 minutes.
7,500.....	
20,000.....	

Studies on concentrations, dangerous with continued exposure, show that concentrations of 100 parts of benzene per million parts of air are generally safe but that they may occasionally cause toxic symptoms with sufficient length of exposure in susceptible individuals (11, 12). Higher concentrations become rapidly dangerous, and fatal accidents have been reported from concentrations of 1,000 parts per million and less.

As with other forms of poisoning, there appears to be considerable variation regarding the susceptibility to exposure to benzene, as illus-

trated by the fact that in several instances only one or a few persons of a large group with evidently the same exposure developed the characteristic signs and symptoms of benzene poisoning.

Symptoms of Acute Benzene Poisoning.

In man, inhalation of large quantities of benzene rapidly causes inebriation. This is soon followed by fatigue, sleepiness, ringing in the ears, vertigo, nausea, vomiting, headache, and staggering gait. With prolonged inhalation of large quantities, twitching, tonic and clonic convulsions, paralysis, and loss of consciousness may result. The respiration is first increased but later slowed and circulatory collapse may result. With very large doses, unconsciousness, convulsions, and death due to respiratory paralysis may occur very rapidly. Depending upon the duration of the unconsciousness and the severity of the circulatory failure, nervous disturbances of different nature may be observed as aftereffects of such poisoning.

Symptoms of Chronic Benzene Poisoning.

The continued exposure to small quantities of benzene may cause such subjective symptoms as fatigue, somnolence, headache, vertigo, general debility, pupillary abnormalities, and gastro-intestinal disturbances. The most conspicuous effect is, however, the effect on the blood and the blood-forming organs, especially the bone marrow and the blood vessels. As a rule the white blood cells, especially the polynuclears, are the first to suffer, and a white cell count of 5,000 to 5,500 and below is usually considered as a sign of incipient benzene poisoning. It has been shown repeatedly, as pointed out by Hunter (1939) (12) and von Oettingen (1940) (13), that the ratio of polynuclears to mononuclears is a better index of incipient poisoning than a moderate leucopenia without differentiation of the different cell types. Several authors have also pointed to eosinophilia as an early alarm signal. On the other hand, it should also be mentioned that earlier investigators (13) and recently Hunter (12) observed not a reduction but an increase in the number of white blood cells. It appears that the blood picture may show considerable variation, depending upon the intensity and the duration of the exposure, the individual susceptibility, and the influence of other factors. Similarly the response of the red blood cells may show a tendency towards polycythemia or, more commonly, towards anemia. This usually occurs, however, after toxic effects on the white blood cells have become manifest and it is associated with corresponding changes of the hemoglobin content.

In the early stages of chronic benzene poisoning, hemorrhages under the skin and the mucous membranes may occur. Bleeding from the gastro-intestinal tract and from the uterus may be observed, and these may be contributing factors to the anemic condition. The

urine may contain albumin, casts, and bile pigments, indicating injury of kidneys and liver.

The *contact of benzene with the skin* may cause erythema, dry scaling, and, occasionally, vesicular papules. Benzene is a fat solvent. It removes the protective fat of the skin and predisposes to secondary infections. More prolonged exposure may result in injury resembling first- and second-degree burns.

Pathological Changes in Benzene Poisoning.

The most characteristic pathological changes are seen in the bone marrow which shows a variety of pictures varying from hyperplasia to hypoplasia and, occasionally, may result in complete aplasia of the myeloid cells (Mallory, Gall and Brickley, 1939) (14). This effect may not be solely restricted to the bone marrow but may extend also to the germinating structures of the lymphatic glands, the pulp of the spleen, the Peyer's plaques, and the cortex of the thymus. Benzene may cause degenerative changes in the liver, kidneys, and heart, varying in intensity with the concentration and the duration of the exposure. The mucous membranes of the gastro-intestinal tract are markedly congested and hemorrhages are not uncommon, and the same holds true for the pleura and the skin. Pathological changes of the blood picture are mainly characterized by leucopenia, but in mild and extreme cases leucocytosis may be observed. In the leucopenic stage there is a relative lymphocytosis. The severity of the poisoning is usually reflected in the reduction of leucocytes and the prognosis becomes bad as their number drops to or below 1,000. The changes of the red blood cells are much less severe and less characteristic. There may be a moderate anisocytosis without poikilocytosis and regenerative forms; in other instances the latter may be present, which may be interpreted as beginning injury of the bone marrow or as a sign of stimulation, as indicated by hyperplasia of the bone marrow. The formation of hemorrhages may be partly explained by an increase of the clotting time, perhaps on account of a reduction of the thrombocytes. It is partly due to vascular damage; the walls of the blood vessels may show degenerative changes of variable intensity, from turbid swelling to fatty degeneration, as may be seen in other organs.

Mechanism of Benzene Poisoning.

The depressant effect of benzene on the central nervous system is probably due to the same mechanism as with the anesthetics of the chlorinated hydrocarbon series and it is presumably closely affiliated with its lipoid solubility and partition coefficient in oil over water. The convulsant action is not yet completely understood but it is not due to the formation of phenols, as has been claimed, because the convulsions produced by the latter are of a different type. At present it

appears most likely that they are due to the anoxemia of the central nervous system caused by circulatory disturbances or by depression of the respiratory center. The anemiagenic effect is the most serious consequence of continued exposure and even comparatively low concentrations may cause such effects. It has been pointed out that hemorrhages may be a contributing factor but the principal cause is the effect on the bone marrow.

Habituation to Benzene.

Unlike other poisons, continued exposure to benzene does not increase the resistance of the organism towards its toxic effects. On the contrary, repeated subtoxic exposure may finally result in sudden and severe injury, as has been observed repeatedly.

Prophylactic Measures.

In order to prevent benzene poisoning, cleanliness of the operation, especially regarding spilling of benzene or benzene-containing materials, is of great importance. The pollution of the air should be prevented by using closed operations whenever possible and such operations should be inspected regularly to insure against leakage and breaks. Whenever such enclosures have to be entered, it should be made certain that they are free from benzene. In case of doubt they should not be entered without proper safety appliances such as air-supplied masks and safety belts. Such work should be performed in the presence of supervisors who are familiar with the potential dangers and the first-aid measures.

In those operations where benzene is used as a solvent and where the pollution of the air by evaporation can hardly be avoided, proper local exhaust ventilation should be provided. Where benzene is evaporated at room temperature, air removal with down draft has been recommended (11). Where localized heat is applied, hoods or enclosures should be provided with up-draft local exhaust ventilation of sufficient intensity and sufficiently close to the source of contamination to insure complete removal of the benzene vapors.

In addition, the proper placement of the personnel is of paramount importance. Juvenile workers appear to be more susceptible than adult males. Chlorosis, tuberculosis, and pregnancy are considered as aggravating factors, and persons suffering from organic heart disease, tendency to hemorrhages, and anemia offer especial risks.

Every person with exposure to benzene should undergo periodical examinations, and special emphasis should be placed on the blood picture; this should not be restricted to the leucocyte count alone but a complete differential count should be made. Decrease of the leucocyte count to less than 5,000, relative lymphocytosis, or eosinophilia should be considered as contraindication for further exposure. But any abnormality such as leucocytosis should also be considered as

a warning signal. Moderate reduction of the red blood cell count of the hemoglobin should also be taken as indication of the beginning of an injurious effect, and the same holds true for any signs of bleeding and hemorrhages. In addition, the ratio of inorganic to total sulfates should be determined, a reduction of which will indicate the existence of exposure to benzene (8). In case, upon repeated examination, the percentage of organic sulfates is 30 percent or more, the concentration of benzene in the air of such operations should be determined and reduced by proper engineering methods.

The Treatment of Benzene Poisoning.

Acute benzene poisoning of moderate degree regresses, usually, promptly after transfer of the patient to fresh air. In more severe cases, especially if the patient is unconscious, he should be transferred to fresh air but any chilling should be avoided and he should be treated symptomatically by a qualified physician. Cases of chronic benzene poisoning require very careful supervision. Especially if the condition is associated with leucopenia, the danger of a secondary infection should be reduced to a minimum because experience has shown that even in the absence of distinct signs of injury to the blood-forming organs, infections may precipitate catastrophic complications. Usually benzene anemia does not very readily respond to blood transfusions nor to liver therapy, but from combination of the latter with iron and the administration of vitamin C better results have been reported (*cf.* von Oettingen, 1940) (13).

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(Those publications preceded by an asterisk (*) are out of print, and those preceded by two asterisks (**) may be obtained from the U. S. Public Health Service, Washington, D. C. It is believed that most of the other publications may be consulted at local medical or technical libraries, or access to them may be secured through State health departments.)

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REPORTED PREVALENCE OF THE COMMON COMMUNICABLE DISEASES DURING 1940

Of the nine common communicable diseases (diphtheria, influenza, measles, meningococcus meningitis, poliomyelitis, scarlet fever, smallpox, typhoid fever, and whooping cough) reported regularly to the Public Health Service each week by the State health officers, the incidence of only two—*influenza* and *poliomyelitis*—was above the 5-year (1935–39) median during 1940. The incidence of the other seven of these diseases was not only below the 5-year median but was lower than that for any of the preceding 5 years (1935–39).¹

The accompanying tables show the totals of the numbers of cases reported weekly by telegraph during 1940 (for 52 weeks ended December 28) and the case rates per 100,000 population for the country as a whole and by geographic areas.

It should be borne in mind that these figures are preliminary and will not agree, in most instances, with the final figures furnished by the States after the end of the calendar year and published annually by the Public Health Service as a supplement to the Public Health Reports under the title "The Notifiable Diseases; Prevalence in States." In recent years, however, there has been fairly close agreement with the final figures with respect to each of these diseases except *influenza*.

The 5-year (1935–39) median and other figures used for comparison are taken from similar preliminary reports.

As these are reported cases, it is recognized that, for various reasons, the figures are incomplete. Also, since the degree of completeness may vary in the different geographic areas, some of the differences shown must be attributed in part to reporting rather than to actual differences in the true prevalence of the disease.

¹ The incidence of whooping cough was the lowest since 1936.

TABLE 1.—Number of cases reported in 1940 and comparison with 5-year median (weekly telegraphic reports)

	Diphtheria	Influenza	Measles	Meningococcus meningitis	Polio-myelitis	Scarlet fever	Small-pox	Typhoid fever	Whooping cough
1940.....	15, 715	309, 669	276, 032	1, 609	9, 769	155, 064	2, 462	9, 585	170, 911
5-year median (1935-1939)....	28, 779	157, 623	374, 854	5, 390	7, 288	223, 425	9, 574	14, 602	191, 391

¹ 3-year (1938-40) average.

TABLE 2.—Case rates per 100,000 population, 1940, by geographic areas (weekly telegraphic reports)

Division	Diphtheria	Influenza	Measles	Meningococcus meningitis	Polio-myelitis	Scarlet fever	Small-pox	Typhoid fever	Whooping cough
United States.....	12.0	257.0	211.5	1.2	7.4	118.0	1.9	7.3	130.4
New England.....	3.4	5.2	467.3	1.1	1.1	107.0	0	3.5	169.8
Middle Atlantic.....	7.2	4.4	220.1	1.3	1.7	169.2	0	4.1	159.2
East North Central.....	9.1	37.3	187.5	.8	13.8	199.1	2.1	3.9	138.9
West North Central.....	8.8	47.0	183.3	1.0	17.2	97.1	7.0	4.9	66.5
South Atlantic.....	20.5	431.4	85.0	1.5	6.1	59.9	.3	10.4	114.7
East South Central.....	15.1	219.8	90.8	2.2	3.5	66.4	1.1	11.5	63.5
West South Central.....	20.4	857.6	166.1	1.1	3.4	27.5	2.7	18.4	96.0
Mountain.....	18.8	1, 000.2	455.7	1.3	8.3	107.3	7.5	11.3	225.5
Pacific.....	11.6	678.7	392.2	.9	9.8	80.2	1.5	5.0	188.8

Diphtheria.—The number of diphtheria cases reported in 1940 was only about 55 percent of the 5-year (1935-39) median. The highest reported incidence was in the Southern and Mountain States and the lowest in the New England States, with the Middle Atlantic and North Central areas taking an intermediate position. Both the South Atlantic and West South Central States showed case rates of more than 20 per 100,000 population, or six times as high as the rate for the New England group (3.4).

Influenza.—The incidence of influenza during the calendar year 1940 was the highest since 1932, and was 96 percent above the 5-year median. The highest incidence was recorded in the Mountain, West South Central, and Pacific States, where Utah, Texas, and California reported the largest numbers of cases. Up to the end of the year, the New England, Middle Atlantic, and North Central areas had been comparatively free from the disease.

As the peak of influenza for the country as a whole usually comes in the late winter or early spring, and as the mild epidemic of the current season began on the West Coast late in November and apparently spread eastward through the Southern States, the figures for the calendar year may not present an accurate comparative picture for the epidemic period.

Measles.—The number of cases of measles reported during 1940 was below that for any of the preceding 5 years. The highest incidence

was recorded in the New England and Mountain States, where the case rates were more than twice the rate for the country as a whole, with the Pacific States next. In only one other area, the Middle Atlantic group, was the rate above that for the country as a whole. The lowest incidence was reported for the South Atlantic and East South Central States, where the rates were less than one-fifth the rate for the New England and Mountain areas.

*Meningococcus meningitis.*²—With only 1,609 cases reported, the incidence of meningococcus meningitis was also lower in 1940 than in any of the preceding 5 years, and was only about 30 percent of the 5-year (1935–39) median. This disease has registered a decline each year since 1936, when 7,392 cases were reported. The highest case rates are shown for the East South Central area, and the lowest for the East North Central and Pacific States.

Poliomyelitis.—A larger number of cases of poliomyelitis was reported in 1940 than in any year since 1935, when 10,732 cases were recorded. The lowest incidence in the preceding 5-year period occurred in 1938, when only 1,710 cases were reported. Preponderantly higher case rates in 1940 are shown for the two North Central groups of States, with the Pacific States next, where California contributed the largest number of cases. The lowest incidence was recorded for the New England and Middle Atlantic areas.

Scarlet fever.—The number of cases of scarlet fever reported in 1940 was about 69 percent of the 5-year median. The pattern of comparative geographic distribution is somewhat similar to that for measles and whooping cough, with the highest incidence rates being recorded for the New England, Middle Atlantic, East North Central, and Mountain States, the only areas with rates higher than 100 per 100,000 population.

Smallpox.—A record low was established in 1940 for smallpox, with only 2,462 cases reported, or about 26 percent of the 5-year median. This may be compared with 48,907 cases reported in 1930, and with 5,371 in 1934, the previous minimum. No cases were reported during the year in the nine New England and Middle Atlantic States, while the highest incidence was recorded for the West North Central and Mountain States.

Typhoid fever.—A new low was also established in 1940 for typhoid fever (including paratyphoid) with a total of 9,585 cases reported, or about 66 percent of the 5-year median. The previous minimum of 12,736 cases was reported in 1939. The case rates show the highest

² During 1940, a total of 12,821 cases of meningococcus meningitis was reported in England and Wales (30.8 per 100,000 population) as compared with 1,516 cases in 1939 and 1,288 in 1938. The rise began in December 1939 and continued through the week of March 2, 1940, when 623 cases were reported, thereafter declining throughout the remainder of the year. The period of highest incidence was between February 4 and March 30, when 4,316 cases were reported.

incidence in the Southern and Mountain States, the West South Central group leading with a rate 50 percent higher than the next highest rates and two and one-half times the rate for the country as a whole.

Whooping cough.—This disease was included in the list of diseases reported weekly by telegraph in 1938. The number of cases reported in 1940 was the lowest for the 3-year period, and approximately 89 percent of the average for the 3 years. The highest incidence rates are those for the Northeastern and Mountain and Pacific States.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period July–December 1940

There is printed herewith a list of publications of the United States Public Health Service issued during the period July–December 1940.

The purpose of the publication of this list is to provide a complete and continuing record of Public Health Service publications, for reference use by librarians, scientific workers, and others interested in particular fields of public health work, and not to offer the publications for indiscriminate free public distribution.

Those publications marked with an asterisk (*) can be obtained only by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices noted.

Periodicals

- *Public Health Reports (weekly), July–December, vol. 55, nos. 28 to 52, pages 1193 to 2412. 5 cents a number.
- *Venereal Disease Information (monthly), July–December, vol. 21, nos. 7 to 12, pages 205 to 412. 5 cents a number.

Reprints From the Public Health Reports

- 2175. Studies in childbirth mortality. II. Age and parity as factors in puerperal fatality. By Jacob Yerushalmy, Carroll E. Palmer, and Morton Kramer. July 5, 1940. 26 pages.
- 2176. A rapid thick film blood stain. By Louis Michelson and Aimee Wilcox. July 5, 1940. 2 pages.
- 2177. Development of the national maritime quarantine system of the United States. By Brock C. Hampton. July 12, 1940. 17 pages; 6 plates.
- 2178. Studies on dental caries. IX. The prevalence and incidence of dental caries experience, dental care, and carious defects requiring treatment in high school children. By Henry Klein and Carroll E. Palmer. July 12, 1940. 11 pages.
- 2179. A study of the role of ventilating systems in the transmission of bacteria. By J. M. DallaValle and Alexander Hollaender. July 12, 1940. 5 pages; 1 plate.
- 2180. American azures in the preparation of satisfactory Giemsa stains for malaria parasites. By M. A. Roe, R. D. Lillie, and A. Wilcox. July 12, 1940. 6 pages.

2181. Natural infection of *Triatoma heidemanni* with *Trypanosoma cruzi* in Texas. By Arzroony Packchanian. July 19, 1940. 6 pages; 2 plates.
2182. The isolation and pathogenicity of *Pityrosporum ovale*. By C. W. Emmons. July 19, 1940. 8 pages.
2183. Protective ointment for the prevention of poison ivy dermatitis. By Louis Schwartz, Leon H. Warren, and Frederick H. Goldman. July 26, 1940. 8 pages; 4 plates.
2184. Effect of synthetic pantothenic acid on adrenal hemorrhage, atrophy, and necrosis in rats. By Floyd S. Daft, W. H. Sebrell, S. H. Babcock, Jr., and T. H. Jukes. July 26, 1940. 5 pages.
2185. Disease outbreaks resulting from faulty environmental sanitation. By Leslie C. Frank. August 2, 1940. 11 pages.
2186. Report on market-milk supplies of certain urban communities, July 1, 1938-June 30, 1940. August 2, 1940. 8 pages.
2187. Susceptibility and resistance of certain species of American deer mice, genus *Peromyscus*, and other rodents to *Leptospira icterohaemorrhagiae*. By Arzroony Packchanian. August 2, 1940. 14 pages; 2 plates.
2188. Disabling morbidity among male and female industrial workers during 1938 and 1939, and among males during the first quarter of 1940, with an inquiry into the occurrence of multiple attacks of disabling sickness and injuries, 1939. By William M. Gafafer. August 2, 1940. 5 pages.
2189. The incidence of cancer in Pittsburgh and Allegheny county, Pennsylvania, 1937. By Arthur J. McDowell. August 9, 1940. 33 pages.
2190. Evaluation of a mouse test for the standardization of the immunizing power of anti-rabies vaccines. By Karl Habel. August 16, 1940. 16 pages.
2191. Helium-oxygen mixtures for alleviation of tubal and sinus block in compressed air workers. By J. W. Crosson, Roy R. Jones, and R. R. Sayers. August 16, 1940. 9 pages.
2192. Disabling morbidity, and mortality from cancer among the male employees of an oil refining company with reference to age, site, and duration, 1933-38, inclusive. By William M. Gafafer and Rosedith Sitgreaves. August 23, 1940. 10 pages.
2193. Experimental transmission of *Trypanosoma cruzi* infection in animals by *Triatoma sanguisuga ambigua*. By Arzroony Packchanian. August 23, 1940. 8 pages; 2 plates.
2194. A diagnosis code for use in tabulating morbidity statistics. By Thomas Parran and William L. Austin. August 30, 1940. 18 pages.
2195. Rheumatic heart disease in Philadelphia hospitals. A study of 4,653 cases of rheumatic heart disease, rheumatic fever, Sydenham's chorea, and subacute bacterial endocarditis involving 5,921 admissions to Philadelphia hospitals, from January 1, 1930, to December 31, 1934. I. Rheumatic heart disease, rheumatic fever, Sydenham's chorea, and subacute bacterial endocarditis as a hospital problem. II. Age, race, and sex distribution and interrelation of rheumatic fever, Sydenham's chorea, rheumatic heart disease, and subacute bacterial endocarditis. III. Fatal rheumatic heart disease and subacute bacterial endocarditis. IV. Influence of season and certain meteorological conditions. V. Distribution by locality of rheumatic conditions in Philadelphia. By O. F. Hedley. September 6, 13, 20, October 4, 11, 1940. 139 pages; 4 halftones.
2196. Factors influencing the efficacy of phenolized rabies vaccines. I. Strains of fixed virus. By Karl Habel. September 6, 1940. 13 pages.

2197. A new apparatus for the administration of helium-oxygen mixtures. By Howard F. Brubach, Laurence R. Crisp, and Paul A. Neal. September 27, 1940. 6 pages; 2 plates.
2198. A brief review of needed research in malaria. October 4, 1940. 9 pages.
2199. *Rickettsia diaporica*: Its persistence in the tissues of *Ornithodoros turicata*. By Gordon E. Davis. October 11, 1940. 3 pages.
2200. Sanitary and physiological aspects of flooring materials. By Joseph M. DallaValle. October 18, 1940. 8 pages.
2201. Studies on the duration of disabling sickness. I. Duration of disability from sickness and nonindustrial injuries among the male and female memberships of 25 industrial sick benefit organizations, 1935-37, inclusive. By William M. Gafafer and Elizabeth S. Frasier. October 18, 1940. 12 pages.
2202. The housing problem as it affects public health nursing activities. By Mary J. Dunn. October 18, 1940. 6 pages.
2203. An institutional outbreak of pneumonitis. I. Epidemiological and clinical studies. By J. W. Hornibrook and K. R. Nelson. II. Isolation and identification of causative agent. By R. E. Dyer, N. H. Topping, and I. A. Bengtson. October 25, 1940. 19 pages; 6 plates.
2204. The relation of body build to drug addiction. By Ralph R. Brown. October 25, 1940. 10 pages.
2205. Frequency and volume of doctors' calls among males and females in 9,000 families, based on Nation-wide periodic canvasses, 1928-31. By Selwyn D. Collins. November 1, 1940. 44 pages.
2206. Teaching of social medicine in liberal arts colleges and universities. By Joseph Hirsh and Elizabeth G. Pritchard. November 8, 1940. 20 pages.
2207. Accidents in the urban home as recorded in the National Health Survey. By Rollo H. Britten, Joan Klebba, and David E. Hailman. November 8, 1940. 26 pages.
2208. Studies of the acute diarrheal diseases. IV. An outbreak of bacillary dysentery due to the "Newcastle dysentery bacillus." By A. V. Hardy, S. Frant, S. W. Jarcho, and E. G. Schlosser. November 15, 1940. 16 pages.
2209. Experimental production of agglutinins for *Trypanosoma cruzi*. By Ardzoony Packchianian. November 15, 1940. 8 pages.
2210. A comprehensive study of influenza in a rural community. By E. R. Rickard, Edwin H. Lennette, and Frank L. Horsfall, Jr. November 22, 1940. 22 pages.
2211. A sanitary log for American ships. Description and plan of operation. By G. C. Sherrard. November 22, 1940. 5 pages.
2212. The tumor clinic of the Baltimore Marine Hospital. By Ernest R. Bryan. November 29, 1940. 5 pages; 3 plates.
2213. The National Health Survey. Receipt of medical services in different urban population groups. By Rollo H. Britten. November 29, 1940. 26 pages.
2214. Colorado tick fever. By Norman H. Topping, James S. Cullyford, and Gordon E. Davis. November 29, 1940. 14 pages.
2215. Studies on foodstuffs fumigated with methyl bromide. By H. C. Dudley, J. W. Miller, P. A. Neal, and R. R. Sayers. December 6, 1940. 32 pages.
2216. Smallpox in the United States: Its decline and geographic distribution. By C. C. Dauer. December 13, 1940. 10 pages.

2217. Qualifications of professional public health personnel. I. Plan and scope of the survey. By Mayhew Derryberry and George Caswell. December 13, 1940. 8 pages.
2218. A recommended procedure for the mouse protection test in evaluation of antimeningococcus serum. By Sara E. Branham and Margaret Pittman. December 20, 1940. 7 pages.
2219. Ticks and relapsing fever in the United States. By Gordon E. Davis. December 20, 1940. 5 pages.
2220. Qualifications of professional public health personnel. II. Health officers and other medical personnel. By Mayhew Derryberry and George Caswell. December 27, 1940. 20 pages.
2233. Chest fluorography with portable X-ray equipment on 35 mm. film. By W. Palmer Dearing and Alexander E. Turner. December 27, 1940. 9 pages; 4 plates.

Supplement to the Public Health Reports

162. Eugenic sterilization in the United States. A comparative summary of statutes and review of court decisions. By James E. Hughes. 1940. 45 pages.

Public Health Bulletins

254. Plague in the western part of the United States. By C. R. Eskey and V. H. Haas. 1940. 83 pages; 57 halftones.
255. Toxicity and potential dangers of aliphatic and aromatic hydrocarbons. A critical review of the literature. By W. F. von Oettingen. 1940. 135 pages.
256. Plumbing and public health. By Arthur B. Cronkright and Arthur P. Miller. 1940. 118 pages; 9 halftones.
257. Cancer mortality in the United States. III. Geographic variation in recorded cancer mortality for detailed sites, for an average of the years 1930-32. By Mary Gover. 1940. 81 pages.
258. A study of medical problems associated with transients. By Charles F. Blankenship and Fred Safier. 1940. 132 pages; 11 halftones.
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174. Studies in chronic selenosis. Part I. The chronic toxicity of naturally occurring food selenium. By M. I. Smith and R. D. Lillie. Part II. Gastric acidity in chronic selenium poisoning. By M. I. Smith and E. F. Stohman. Part III. Liver function and bile pigments in experimental chronic selenium poisoning. By M. I. Smith, B. B. Westfall, and E. F. Stohman. Part IV. Selenium in the hair as an index of the extent of its deposition in the tissues in chronic poisoning. By B. B. Westfall and M. I. Smith. 1940. 49 pages; 4 halftones.
176. Acute response of guinea pigs to the inhalation of ketone vapors. By H. Specht, J. W. Miller, P. J. Valaer, and R. R. Sayers. 66 pages.

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- Index to Public Health Reports, volume 55, part 1, January-June 1940. 19 pages.

Reprints from Venereal Disease Information

129. A study of consultation by correspondence in syphilis. 2,000 questions the doctor asks about syphilis. By John H. Stokes, Norman R. Ingraham, Jr., and Emily Stannard. Vol. 21, May 1940. 28 pages.
130. Serodiagnostic tests as performed in State laboratories, 1938-39. Report of committee on evaluation of serodiagnostic tests for syphilis. Vol. 21, June 1940. 13 pages.
131. Development of sulfapyridine-fast strains of the gonococcus. By Louise Westphal, Ruth L. Charles, and C. M. Carpenter. Vol. 21, June 1940. 4 pages.
132. Venereal disease control program in Georgia. By L. E. Burney. Vol. 21, June 1940. 3 pages.
133. Gonococcal vaginitis. By Alfred Cohn, Arthur Steer, and Eleanor L. Adler. Vol. 21, July 1940. 13 pages.
137. A common error in obtaining specimens for the cultural diagnosis of gonococcal infections in women. By Frederick G. Gillick, S. Edward Sulkin, and Leroy J. Stephens. Vol. 21, September 1940. 3 pages.

Supplements to Venereal Disease Information

11. Technics of serodiagnostic tests for syphilis. 72 pages.
12. Conference on Venereal Disease Control. 37 pages.

Venereal Disease Bulletin

94. It can happen to you. 13 pages.

Venereal Disease Posters

10. Syphilis strikes 1 in 10 before 50.
11. A blood test for every one—the only sure check.

COURT DECISION ON PUBLIC HEALTH

Licensing of business of rendering.—(Wisconsin Supreme Court; *LaForge et al. v. State Board of Health et al.*, 296 N.W. 93; decided February 4, 1941.) Certain persons who were residents of, and engaged in the business of rendering in, Illinois desired to collect dead animal matter in Wisconsin and transport it to their plant in Illinois. Under a Wisconsin statute the transportation of such matter on the public highways of the State was unlawful except by a renderer licensed under the statute, and the said persons sought by mandamus to compel the Wisconsin State Board of Health to issue a renderer's license to them. The statute further provided that the transportation of dead animal matter into other States should not be allowed "except by reciprocal agreement with adjoining States or under rules" of the State board of health. The order of the trial court was adverse to the petitioners and this order was affirmed by the supreme court.

The business of rendering, according to the appellate court, included the collection of dead animal matter and its transportation to and disposal at a rendering plant. The plants in which rendering took place were to be constructed and operated according to the terms

of the statute, which terms associated process and place. "In the granting of the licenses it is required that both be subject to inspection and regulation. Necessarily these elements are bound together and constitute a single licensed operation." It appearing that there was no reciprocal agreement between Wisconsin and any adjoining State, the court then considered whether the statutory wording, "or under rules of the board" would aid the petitioners. The court said that, in considering such language, it must be evident that no rule of the board of health could bring to that board the right to inspect and regulate a rendering plant in a neighboring State. Although an operator of a plant might be willing to do everything he could to satisfy the board's requirements, a license was not to issue except where the board had a right to inspect and where the plant had been constructed to comply with the statutory specifications. The view of the court was that the words under consideration related to things other than the issuing of a license and that the true meaning of the enactment was expressed when the phrase was read "except by reciprocal agreement and under rules of the board." "There must be a reciprocal agreement before there would in such case be occasion for a rule."

DEATHS DURING WEEK ENDED MARCH 1, 1941

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Mar. 1, 1941	Correspond- ing week, 1940
Data from 88 large cities of the United States:		
Total deaths.....	9,286	9,333
Average for 3 prior years.....	9,332
Total deaths, first 9 weeks of year.....	87,648	86,083
Deaths under 1 year of age.....	585	508
Average for 3 prior years.....	534
Deaths under 1 year of age, first 9 weeks of year.....	4,938	4,846
Data from industrial insurance companies:		
Policies in force.....	64,657,311	66,104,679
Number of death claims.....	14,562	15,157
Death claims per 1,000 policies in force, annual rate.....	11.7	12.0
Death claims per 1,000 policies, first 9 weeks of year, annual rate.....	10.9	10.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 8, 1941

Summary

The incidence of measles again recorded an increase over the preceding week, with 34,420 cases reported currently as compared with 31,490 for the earlier week. The rate of increase, however, showed a decline. The Middle Atlantic, East North Central, and South Atlantic States continue to report the highest incidence. The number of cases reported currently is 3 times the 5-year (1936-40) median, while the total number reported to date this year (first 10 weeks) is a little more than 2½ times the 5-year cumulative median for the corresponding period. This 5-year period, however, includes only one "measles year"—1938.

For the first time since the decline in influenza began, during the week ended January 25, 1941, the reported weekly incidence (8,204 cases) dropped below the 5-year median (11,131). For the first 10 weeks of the current year, a total of 550,097 cases has been reported as compared with a 5-year cumulative median of 69,182.

Of 23 cases of endemic typhus fever, 10 cases occurred in Georgia and 7 in Texas; and of 44 cases of smallpox, 8 cases were reported in Washington State, 6 in Minnesota, and 5 in Iowa. One case of undulant fever was reported in North Carolina and 1 case of Rocky Mountain spotted fever in Montana.

The death rate for the current week for 92 major cities in the United States, as reported by the Bureau of the Census, was 12.7 per 1,000 population, as compared with 13.0 for the preceding week and with a 3-year (1938-40) average of 13.1 for 88 cities.

Telegraphic morbidity reports from State health officers for the week ended March 8, 1941, and comparison with corresponding week of 1940 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Med-ian, 1936-40	Week ended		Med-ian, 1936-40	Week ended		Med-ian, 1936-40	Week ended		Med-ian, 1936-40
	Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940	
NEW ENG.												
Maine.....	0	1	1	6	1	8	208	236	147	0	1	0
New Hampshire.....	0	0	0	8			81	140	26	0	0	0
Vermont.....	0	0	0				17	7	19	0	0	0
Massachusetts.....	2	2	2				594	266	810	1	2	2
Rhode Island.....	0	0	1				0	161	39	0	1	1
Connecticut.....	1	3	2	26	9	26	52	238	238	1	0	0
MID. ATL.												
New York.....	26	17	37	159	140	147	6,415	467	1,482	1	2	11
New Jersey.....	6	7	10	123	13	28	2,071	183	183	1	0	1
Pennsylvania.....	14	35	46				3,995	221	299	8	5	6
E. NO. CEN.												
Ohio.....	17	22	21	273	36	36	4,742	27	137	2	2	4
Indiana.....	12	9	16	52	86	86	450	12	12	1	1	1
Illinois.....	17	23	35	34	56	63	3,266	58	57	2	1	5
Michigan.....	7	5	10	28	12	6	3,159	319	319	3	1	1
Wisconsin.....	0	4	3	175	420	91	873	377	377	0	1	1
W. NO. CEN.												
Minnesota.....	1	1	3	26	4	4	5	240	240	1	0	0
Iowa.....	3	4	4	247	28	17	183	328	163	0	0	1
Missouri.....	7	11	18	22	8	195	86	8	14	0	0	3
North Dakota.....	1	2	2	30	36	6	9	6	6	0	0	0
South Dakota.....	0	1	1	4	1	1	11	2	4	0	0	0
Nebraska.....	1	2	3	14	7	7	6	33	33	1	0	1
Kansas.....	3	11	11	20	29	43	564	522	49	3	1	0
SO. ATL.												
Delaware.....	1	0	0				431	1	28	0	0	0
Maryland.....	2	2	7	57	53	53	104	5	195	2	0	1
Dist. of Col.....	0	6	7	46		4	89	0	16	1	0	1
Virginia.....	9	18	15	1,016	1,182	1,182	1,537	48	241	3	1	2
West Virginia.....	4	11	8	113	893	135	306	10	10	0	4	5
North Carolina.....	20	14	14	135	116	278	649	170	170	1	0	1
South Carolina.....	5	7	4	958	766	1,005	194	18	36	1	1	2
Georgia.....	6	3	9	267	287	420	341	156	156	0	0	1
Florida.....	2	5	7	154	26	20	438	137	46	2	1	1
E. SO. CEN.												
Kentucky.....	9	8	9	80	83	83	657	56	81	1	1	6
Tennessee.....	9	4	4	275	261	452	364	117	117	0	1	3
Alabama.....	8	13	11	401	501	1,126	279	174	174	5	1	1
Mississippi.....	1	6	5							3	2	1
W. SO. CEN.												
Arkansas.....	4	5	8	665	501	346	152	6	6	1	0	0
Louisiana.....	4	7	10	42	135	135	21	5	11	2	0	1
Oklahoma.....	5	4	7	253	355	337	5	7	25	3	0	1
Texas.....	44	34	44	1,658	2,854	1,279	620	745	420	2	2	5
MOUNTAIN												
Montana.....	0	9	2	19	8	23	1	28	46	0	0	0
Idaho.....	0	1	1		2	5	3	58	29	0	2	0
Wyoming.....	0	0	0	5	10		48	39	12	0	1	0
Colorado.....	15	4	8	61	30		213	25	25	0	1	0
New Mexico.....	0	0	2	51	3	9	220	9	44	0	0	0
Arizona.....	2	4	4	157	273	191	203	42	42	0	0	0
Utah.....	1	1	0	8	9		35	264	145	0	0	0
Nevada.....	1			172			0			0		
PACIFIC												
Washington.....	4	0	1	18	3	3	96	930	329	0	0	1
Oregon.....	1	2	1	40	42	57	418	471	41	0	0	0
California.....	9	20	28	406	411	411	209	417	417	3	2	4
Total.....	284	348	450	8,204	9,590	11,131	34,420	7,789	11,276	55	38	85
10 weeks.....	2,942	4,064	5,506	550,097	133,764	69,182	179,301	52,598	69,341	453	389	943

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 8, 1941, and comparison with corresponding week of 1940 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1936-40	Week ended		Median 1936-40	Week ended		Median 1936-40	Week ended		Median 1936-40
	Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940	
NEW. ENG.												
Maine.....	0	0	0	12	13	17	0	0	0	0	0	0
New Hampshire.....	0	0	0	7	2	13	0	0	0	0	0	0
Vermont.....	0	0	0	4	23	19	0	0	0	0	0	0
Massachusetts.....	0	0	0	124	140	256	0	0	0	2	1	1
Rhode Island.....	0	0	0	5	16	16	0	0	0	0	0	0
Connecticut.....	0	0	0	55	69	111	0	0	0	1	2	1
MID. ATL.												
New York.....	0	1	1	467	933	937	0	0	0	4	2	6
New Jersey.....	0	0	0	309	380	232	0	0	0	3	1	2
Pennsylvania.....	0	1	1	290	430	649	0	0	0	5	7	7
E. NO. CEN.												
Ohio.....	0	0	0	397	307	454	0	0	2	4	3	3
Indiana.....	0	0	0	161	288	238	2	2	3	2	1	1
Illinois.....	1	0	1	448	655	714	0	3	22	2	3	5
Michigan ¹	0	0	0	211	299	609	0	0	1	8	5	3
Wisconsin.....	0	4	1	137	149	238	2	6	9	2	3	2
W. NO. CEN.												
Minnesota.....	0	0	0	66	98	153	6	12	9	0	0	0
Iowa.....	1	0	0	65	65	198	5	4	31	1	1	1
Missouri.....	0	0	0	126	70	195	2	8	11	2	2	3
North Dakota.....	0	0	0	12	25	25	0	1	1	0	0	0
South Dakota.....	1	0	0	16	13	40	0	0	8	0	0	0
Nebraska.....	0	0	0	30	26	57	0	1	10	0	0	0
Kansas ²	1	0	0	53	82	207	6	1	20	1	0	1
SO. ATL.												
Delaware.....	0	0	0	10	14	10	0	0	0	0	1	0
Maryland ¹	0	0	0	51	57	57	0	0	0	1	3	2
Dist. of Col.....	0	0	0	26	35	24	0	0	0	1	0	0
Virginia ²	1	0	0	31	61	36	0	0	0	3	3	3
West Virginia ²	0	1	0	57	56	49	0	0	0	1	3	3
North Carolina.....	0	0	0	62	61	43	0	0	0	0	1	3
South Carolina ²	0	0	0	13	5	5	0	0	0	9	0	0
Georgia ²	0	1	0	23	22	17	0	1	1	3	2	2
Florida ²	3	0	0	8	10	9	0	0	0	3	5	3
E. SO. CEN.												
Kentucky.....	1	0	1	185	69	72	0	0	1	12	4	3
Tennessee.....	0	0	0	155	76	34	0	0	2	8	0	1
Alabama ¹	1	2	1	19	13	17	0	0	0	0	1	2
Mississippi ²	0	0	1	9	7	7	0	1	0	2	1	1
W. SO. CEN.												
Arkansas.....	1	0	0	13	7	12	2	5	5	1	1	2
Louisiana.....	0	0	0	4	26	17	0	0	1	3	2	13
Oklahoma.....	1	0	0	22	15	33	4	42	16	3	0	3
Texas ²	1	0	1	62	52	87	2	0	9	4	3	8
MOUNTAIN												
Montana ⁴	0	0	0	40	42	42	0	0	7	0	0	0
Idaho.....	0	0	0	8	15	19	0	1	4	0	0	0
Wyoming.....	0	0	0	9	9	14	0	0	0	0	1	0
Colorado.....	0	0	0	23	43	44	2	1	3	1	0	0
New Mexico.....	0	0	0	5	11	30	0	0	0	0	0	0
Arizona.....	0	0	0	4	4	9	0	0	0	2	1	0
Utah ²	0	0	0	5	17	31	0	0	0	2	1	0
Nevada.....	0	0	0	8	8	8	1	0	0	2	0	0
PACIFIC												
Washington.....	1	0	0	20	35	55	8	0	6	1	0	1
Oregon.....	2	0	0	12	23	35	2	0	19	0	3	2
California.....	1	2	1	102	156	235	0	5	11	6	2	3
Total.....	17	12	16	3,981	5,024	6,900	44	94	285	105	69	106
10 weeks.....	306	287	211	34,351	45,937	61,200	457	734	2,942	736	739	1,101

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 8, 1941, and comparison with corresponding week of 1940 and 5-year median—Con.

Division and State	Whooping cough		Division and State	Whooping cough	
	Week ended			Week ended	
	Mar. 8, 1941	Mar. 9, 1940		Mar. 8, 1941	Mar. 9, 1940
NEW ENG.			SO. ATL.—continued		
Maine.....	56	50	North Carolina.....	272	95
New Hampshire.....	3	10	South Carolina ²	124	15
Vermont.....	10	25	Georgia ²	17	38
Massachusetts.....	269	178	Florida ²	13	14
Rhode Island.....	12	9			
Connecticut.....	68	20	E. SO. CEN.		
MID. ATL.			Kentucky.....	42	72
New York.....	361	404	Tennessee.....	89	36
New Jersey.....	72	108	Alabama ²	10	23
Pennsylvania.....	320	472	Mississippi ²		
E. NO. CEN.			W. SO. CEN.		
Ohio.....	358	138	Arkansas.....	16	7
Indiana.....	9	40	Louisiana.....	3	1
Illinois.....	98	138	Oklahoma.....	26	2
Michigan ²	274	115	Texas ²	342	195
Wisconsin.....	145	113	MOUNTAIN		
W. NO. CEN.			Montana ⁴	40	3
Minnesota.....	103	33	Idaho.....	5	0
Iowa.....	61	23	Wyoming.....	0	4
Missouri.....	57	27	Colorado.....	45	11
North Dakota.....	30	8	New Mexico.....	24	19
South Dakota.....	21	2	Arizona.....	17	44
Nebraska.....	14	3	Utah ²	84	217
Kansas ²	171	38	Nevada.....	9	
SO. ATL.			PACIFIC		
Delaware.....	9	8	Washington.....	78	32
Maryland ²	59	250	Oregon.....	10	56
Dist. of Col.....	6	24	California.....	400	246
Virginia ²	143	36	Total.....	4,448	3,434
West Virginia ²	53	32	10 weeks.....	42,226	28,701

¹ New York City only.

² Period ended earlier than Saturday.

³ Typhus fever, week ended Mar. 8, 1941, 23 cases as follows: Kansas, 1; Virginia, 1; South Carolina, 1; Georgia, 10; Florida, 2; Alabama, 1; Texas, 7.

⁴ Rocky Mountain spotted fever, week ended Mar. 8, 1941, cases: Montana, 1.

⁵ Delayed reports of approximately 150 cases included.

WEEKLY REPORTS FROM CITIES

City reports for week ended February 22, 1941

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	143	1,050	143	4,824	932	2,000	30	387	19	1,108	
Current week ¹	76	973	81	11,442	569	1,138	2	328	17	1,238	
Maine:											
Portland	0		0	1	3	1	0	0	0	6	19
New Hampshire:											
Concord	0		0	0	1	0	0	0	0	0	12
Manchester	0		0	0	2	3	0	1	0	0	18
Nashua	0		0	0	0	0	0	0	0	0	9
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	8
Burlington	0		0	0	0	0	0	0	0	0	4
Rutland	0		0	0	0	0	0	0	0	0	
Massachusetts:											
Boston	0		2	133	16	39	0	9	1	60	232
Fall River	0		0	2	1	6	0	2	0	3	34
Springfield	0		0	1	2	3	0	1	0	0	35
Worcester	0		0	83	3	6	0	1	0	4	47
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	1	0	16
Providence	0		0	0	6	2	0	4	0	18	68
Connecticut:											
Bridgeport	0	5	0	0	2	6	0	0	0	6	34
Hartford	0	1	0	1	1	2	0	0	0	3	48
New Haven	0	3	0	2	0	7	0	0	0	12	45
New York:											
Buffalo	0		2	62	8	22	0	5	0	13	132
New York	22	162	4	4,072	119	209	0	69	3	133	1,632
Rochester	0		0	8	4	2	0	1	1	5	71
Syracuse	0		0	0	3	0	0	0	0	13	46
New Jersey:											
Camden	0	1	1	33	2	7	0	1	0	2	29
Newark	0	38	0	276	14	41	0	4	0	15	99
Trenton	0	6	1	12	2	68	0	1	0	2	58
Pennsylvania:											
Philadelphia	2	9	2	1,300	41	101	0	24	4	70	534
Pittsburgh	0	13	6	37	12	5	0	7	0	42	175
Reading	0		1	235	3	0	0	1	0	8	38
Scranton	0			5		1	0		0	2	
Ohio:											
Cincinnati	0	6	1	47	5	15	0	3	0	4	136
Cleveland	1	105	4	1,329	17	34	0	4	0	102	166
Columbus	0	1	1	35	2	15	0	4	0	48	80
Toledo	0	1	0	17	8	5	0	4	0	14	96
Indiana:											
Anderson	0		0	2	1	0	0	0	0	0	15
Fort Wayne	0		0	28	4	4	0	1	0	0	23
Indianapolis	1		2	73	13	30	0	3	0	5	112
Muncie	0		0	2	2	9	0	0	0	0	14
South Bend	0		0	5	3	1	0	0	0	0	23
Terre Haute	0		0	1	7	1	0	0	0	0	26
Illinois:											
Alton	0			0	2	3	0		0	0	
Chicago	13	15	5	1,777	39	172	0	36	3	32	780
Elgin	0		0	59	1	0	0	0	0	0	21
Moline	0		0	18	0	0	0	0	0	0	5
Springfield	0	3	1	0	3	3	0	0	0	5	22
Michigan:											
Detroit	1	18	3	968	13	94	0	18	0	147	290
Flint	0		0	28	1	2	0	0	0	3	30
Grand Rapids	0		0	97	0	6	0	1	0	8	27
Wisconsin:											
Kenosha	0		0	37	0	0	0	0	0	3	12
Madison	0		0	3	0	1	0	0	0	0	18
Milwaukee	1	2	1	54	11	19	0	5	0	52	121
Racine	0		0	0	0	6	0	1	0	3	11
Superior	0		0	0	0	2	0	0	0	0	6

¹ Figures for Barre estimated; report not received.

City reports for week ended February 22, 1941—Continued

State and city	Diphtheria cases		Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
	Cases	Deaths	Cases	Deaths								
Minnesota:												
Duluth.....	0	0	0	2	0	0	0	0	0	0	4	21
Minneapolis.....	0	51	0	2	6	9	0	1	0	0	12	105
St. Paul.....	0	2	2	0	7	3	0	0	0	0	6	64
Iowa:												
Cedar Rapids.....	0	0	0	0	0	2	0	0	0	0	0	0
Davenport.....	0	0	1	0	0	3	0	0	0	0	0	0
Des Moines.....	1	0	0	0	0	5	0	0	0	0	0	27
Sioux City.....	0	0	1	0	0	0	0	0	0	0	6	0
Waterloo.....	0	0	4	0	0	0	0	0	0	0	2	0
Missouri:												
Kansas City.....	0	1	2	5	6	5	0	2	0	0	18	101
St. Joseph.....	1	0	0	3	8	0	0	1	0	0	2	23
St. Louis.....	6	7	0	17	16	47	0	3	0	0	23	198
North Dakota:												
Fargo.....	0	0	0	0	0	2	0	0	0	0	17	4
Grand Forks.....	0	0	0	0	0	0	0	0	0	0	0	0
Minot.....	0	0	1	0	0	0	0	0	0	0	0	9
South Dakota:												
Aberdeen.....	0	0	0	0	0	2	0	0	0	0	0	0
Nebraska:												
Lincoln.....	0	0	1	1	6	3	0	0	0	0	2	0
Omaha.....	1	0	1	5	3	0	1	0	0	0	0	52
Kansas:												
Lawrence.....	0	0	0	12	0	0	0	0	0	0	2	3
Topeka.....	0	0	0	18	5	0	0	0	0	0	7	26
Wichita.....	0	5	0	0	4	0	0	1	0	0	16	42
Delaware:												
Wilmington.....	0	0	0	108	0	4	0	0	0	0	0	32
Maryland:												
Baltimore.....	1	25	7	31	18	26	0	14	0	0	62	220
Cumberland.....	0	0	0	0	0	0	0	0	0	0	0	10
Frederick.....	0	0	0	0	1	1	0	0	0	0	0	4
Dist. of Col.:												
Washington.....	1	18	1	59	14	18	0	12	0	0	7	171
Virginia:												
Lynchburg.....	1	0	0	1	0	0	0	0	0	0	0	13
Richmond.....	1	0	0	19	4	6	0	0	0	0	0	46
Roanoke.....	0	0	0	121	0	1	0	0	0	0	3	21
West Virginia:												
Charleston.....	0	1	1	53	3	3	0	0	0	0	2	33
Huntington.....	1	0	0	1	0	0	0	0	0	0	0	0
Wheeling.....	0	0	0	0	0	0	0	1	0	0	0	22
North Carolina:												
Gastonia.....	0	0	0	3	0	0	0	0	0	0	5	0
Raleigh.....	0	1	1	48	5	1	0	0	0	0	16	23
Wilmington.....	0	0	1	10	1	0	0	0	0	0	1	14
Winston-Salem.....	1	0	2	2	0	2	0	0	0	0	29	17
South Carolina:												
Charleston.....	0	50	1	24	3	0	0	0	1	1	1	24
Florence.....	0	3	0	0	0	0	0	0	0	0	0	5
Greenville.....	0	0	0	13	0	0	0	0	0	0	11	16
Georgia:												
Atlanta.....	0	8	0	19	4	6	0	5	0	0	4	70
Brunswick.....	0	0	0	1	2	0	0	1	0	0	0	4
Savannah.....	0	38	3	4	1	0	0	2	0	0	0	28
Florida:												
Miami.....	0	15	0	1	1	0	0	2	0	0	1	49
Tampa.....	0	1	0	0	2	0	0	0	0	0	0	34
Kentucky:												
Ashland.....	0	0	0	1	0	2	0	0	0	0	0	4
Covington.....	0	1	0	6	4	0	0	0	0	0	0	16
Lexington.....	0	0	0	11	2	0	0	1	0	0	0	20
Louisville.....	0	3	0	49	8	39	0	1	0	0	11	84
Tennessee:												
Knoxville.....	0	0	4	19	2	6	0	2	0	0	15	29
Memphis.....	0	11	2	33	4	4	0	6	1	1	15	83
Nashville.....	0	0	1	12	4	6	0	1	0	0	14	52
Alabama:												
Birmingham.....	0	37	5	44	12	2	0	5	0	0	3	81
Mobile.....	2	11	0	5	1	0	0	0	0	0	0	26
Montgomery.....	0	8	0	12	0	1	0	0	0	0	0	0
Arkansas:												
Fort Smith.....	0	0	0	1	0	0	0	0	0	0	0	0
Little Rock.....	0	10	1	1	7	0	0	5	0	0	2	64
Louisiana:												
Lake Charles.....	0	0	0	0	1	0	0	0	0	0	0	11
New Orleans.....	0	9	1	0	10	6	0	9	1	0	0	141
Shreveport.....	4	1	0	0	3	0	0	3	0	0	5	32

City reports for week ended February 22, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Oklahoma City.....	0	22	0	1	2	1	0	1	0	3	43
Tulsa.....	3		0	1	6	0	0	0	0	2	31
Texas:											
Dallas.....	0	2	2	3	5	11	0	6	0	4	71
Fort Worth.....	0		1	123	4	3	0	2	0	2	62
Galveston.....	0	0	0	0	1	0	0	1	0	0	17
Houston.....	0	1	2	0	4	2	1	4	0	0	75
San Antonio.....	0	5	4	0	9	0	0	6	0	0	87
Montana:											
Billings.....	0		0	0	1	0	0	0	0	0	10
Great Falls.....	0	2	0	0	1	0	0	0	0	0	8
Helena.....	0		0	0	0	0	0	0	0	0	4
Missoula.....	0	2	0	0	1	2	0	0	1	0	6
Idaho:											
Boise.....	0		0	0	1	0	0	0	0	0	7
Colorado:											
Denver.....	10	22	2	27	5	3	1	6	0	28	74
Pueblo.....	0		0	0	0	1	0	0	0	0	10
New Mexico:											
Albuquerque.....	0		0	0	2	0	0	3	0	0	13
Utah:											
Salt Lake City.....	1			1		0	0		0	7	30
Washington:											
Seattle.....	3		2	8	3	6	0	4	0	13	98
Spokane.....	0		0	8	2	3	0	0	0	0	23
Tacoma.....	0		0	0	2	0	0	0	0	3	36
Oregon:											
Portland.....	0	2	2	10	6	1	0	1	1	0	82
Salem.....	0			0		0	0		0	6	
California:											
Los Angeles.....	0	43	1	11	5	16	0	12	1	30	358
Sacramento.....	2		0	1	1	2	0	1	0	1	26
San Francisco.....	0	222	0	5	9	6	0	8	0	56	186

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				South Carolina:			
Boston.....	1	0	0	Charleston.....	1	0	0
Worcester.....	1	0	0	Florence.....	0	2	0
New York:				Tennessee:			
New York.....	1	1	1	Nashville.....	0	1	0
Pennsylvania:				Alabama:			
Philadelphia.....	1	0	0	Birmingham.....	1	0	0
Ohio:				Louisiana:			
Cleveland.....	0	1	0	Shreveport.....	0	2	0
Toledo.....	0	0	1	Texas:			
Michigan:				Dallas.....	0	1	0
Flint.....	1	0	0	California:			
				Los Angeles.....	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Topeka, 1; Denver, 2.
 Pellagra.—Cases: Charleston, S. C., 1; Savannah, 2.
 Typhus fever.—Cases: Atlanta, 1; Savannah, 1; Mobile, 1.

TERRITORIES AND POSSESSIONS

HAWAII TERRITORY

Plague (rodent).—Rats proved positive for plague have been found in Hawaii Territory as follows: 1 rat on February 4 and another rat on February 5, both at Kalopa Homesteads, Paauhau area, Hamakua District, Island of Hawaii, and 1 rat on February 11 and another rat on February 18, both found about 8½ miles from Kahului, Island of Maui.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 1, 1941.—During the week ended February 1, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1	5		7	8		2		10	33
Chickenpox		3	10	138	334	28	31	24	107	675
Diphtheria		17		44	2	6	3		1	73
Dysentery				5						5
Influenza		3			469	1			176	649
Measles	1	111	144	173	593	224	235	351	575	2,407
Mumps				90	201	28	5	16	38	376
Pneumonia	3	7			22	2	3		16	53
Scarlet fever		22	10	109	152	7	10	9	21	340
Trachoma							1		1	2
Tuberculosis		1	7	61	47		8			124
Typhoid and paratyphoid fever			2	11	1		2			16
Whooping cough				146	236	11	42	11	25	471

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended June 29, 1940.—During the 13 weeks ended June 29, 1940, cases of certain communicable diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	8,979	Puerperal pyrexia	1,633
Dysentery	555	Scarlet fever	11,823
Ophthalmia neonatorum	1,207	Typhoid and paratyphoid fever	808
Pneumonia	9,345		

England and Wales—Vital statistics—Second quarter 1940.—The following vital statistics for the second quarter ended June 30, 1940, for England and Wales are taken from the Quarterly Return of Births,

Deaths, and Marriages, issued by the Registrar General, and are provisional:

	Number	Annual rate per 1,000 population		Number	Annual rate per 1,000 population
Live births.....	166, 537	16. 2	Deaths from:—Continued		
Stillbirths.....	5, 969	. 58	Influenza.....	1, 107	. 11
Deaths, all causes.....	118, 055	11. 8	Measles.....	153	. 02
Deaths under 1 year of age.....	7, 681	1. 46	Scarlet fever.....	35	. 00
Deaths from:			Typhoid and paratyphoid fever.....	23	. 00
Diarrhea and enteritis (under 2 years of age).....	604	1. 3. 6	Whooping cough.....	103	. 01
Diphtheria.....	398	. 04			

¹ Per 1,000 live births.

NOTE.—The above deaths include only civilians.

JAMAICA

Communicable diseases—4 weeks ended February 15, 1941.—During the 4 weeks ended February 15, 1941, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox.....	10	11	Puerperal sepsis.....		8
Diphtheria.....		3	Scarlet fever.....		1
Dysentery.....	4	6	Tuberculosis.....	30	60
Leprosy.....		1	Typhoid fever.....	13	42

SWEDEN

Notifiable diseases—November 1940.—During the month of November 1940, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	1	Poliomyelitis.....	30
Diphtheria.....	19	Scarlet fever.....	1, 199
Dysentery.....	19	Syphilis.....	27
Epidemic encephalitis.....	1	Typhoid fever.....	2
Gonorrhoea.....	805	Undulant fever.....	11
Paratyphoid fever.....	39		

VENEZUELA

Poliomyelitis.—According to information dated January 31, 1941, 85 positive cases of poliomyelitis had been reported in Caracas and elsewhere in Venezuela since October 1940. The cases reported by months are as follows: October, 5; November, 11; December, 26; January 1–30, 1941, 43. The mortality was said to average about 11 percent.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS of February 28, 1941, pages 416-420. A similar table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Argentina—Cordoba Province.—During the month of January 1941, 1 case of plague was reported in Cordoba Province, Argentina.

New Caledonia—Goro.—A report dated March 3, 1941, states that 7 cases of human plague with 6 deaths have occurred at Goro at the north end of the island of New Caledonia.

Peru.—During the month of December 1940, plague has been reported in Peru as follows: Libertad Department, 1 case; Lima Department, 1 case, 1 death; Piura Department, 3 cases, 2 deaths; Tumbes Department, 1 case, 1 death.

On vessel—S. S. Urumba.—A fatal case of plague has been confirmed in a stowaway on the S. S. *Urumba* arriving at Valparaiso, Chile, from Peru on February 11, 1941.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department, January 7-22, 1941, 3 deaths; Cundinamarca Department, December 1-31, 1940, 1 death; Intendencia of Meta, November 18, 1940, 1 case; Intendencias and Commissaries, December 1-31, 1940, 4 deaths; Santander Department, January 13, 1941, 1 death; Tolima Department, December 1-31, 1940, 6 deaths, January 17, 1941, 1 death.

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